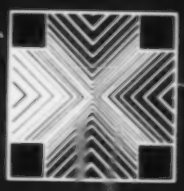

Population Trends and Public Policy Number 3 December 1981

Population Change, Resources, and the Environment

Summary—How can the world's population live in balance with resources it uses and the environment it both inhabits and shapes? In discussing this issue at a recent meeting at the Johnson Foundation Wingspread Conference Center, speakers and participants in particular noted that many important resources, most notably food, depend on the health of the natural world for their continued production. Rapid population growth intensifies the stress on this natural world, often with the consequence of increased human suffering. David Pimentel spoke about the extent of this dependence and the limits already working against expansion of the food supply. Anne Erlich listed and explained the environmental consequences of growing more food in the usual ways, with fertilizers, pesticides, irrigation, mechanization, and a reliance on crops of a single, genetically uniform strain. Stephen Schneider discussed the dilemma of fostering economic development in the Third World and the environmental consequences of that development. The use of additional fossil fuels will be worth the price in pollution, he concluded, if it buys development that lowers birth rates. For the gamble to pay off, though, it must be taken now; delay will exact an enormous price in ultimate world population size and total damage from pollution. The complexity of the problems discussed at the Conference and the overlap among subject areas—food production, energy production and use, environmental quality, family planning, economic growth—suggest the complexity of the remedies required.

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Population Trends and Public Policy, Number 4, December, 1983

Editor: Judith Jacobsen

Population Change, Resources, and the Environment

The Population Reference Bureau, Inc., recently sponsored a conference at the Johnson Foundation Wingspread Conference Center in Racine, Wisconsin. Part of a larger PRB project to inform and educate Americans about population, resources, and environmental issues, the Conference brought together 50 people from 18 states for three days of talks and discussion.

Many subjects were discussed at Wingspread—from organic farming to energy-efficient housing design to population growth rates in nineteenth-century Sweden. But a single large question drove all that was said: how can the world's population live in balance with resources it uses and the environment it both inhabits and shapes?

Population growth is a familiar topic; the "population explosion" has been in the news since the sixties. And people know a bit more now about resource scarcities—the Arab oil embargo brought that home to Americans who, unlike many in the Third World, had not since World War II had to cope with a shortage of any kind. People are also familiar with pollution and with efforts to preserve the environment. But not as many are conversant with an element of the population/resources/environment situation that received most of the attention at the Wingspread Conference: that many important resources, most notably food, depend on the health of the natural world for their continued production. Thus abusing the environment, either through overuse or contamination, affects its productivity and can in the long term reduce the resources available.

Rapid population growth intensifies environmental stresses and the environmental damage that lowers productivity, particularly agricultural productivity, often with the consequence of increased human suffering. Kingsley Davis of the Hoover Institution, Stanford, California, set the stage for the Wingspread Conference with his keynote speech on the dimensions of world population growth and the strategies needed to cope with rapid population growth. David Pimentel of Cornell University spoke about the extent of human dependence on the natural world and the limits already working against expansion of the food supply. Anne Ehrlich of Stanford University listed and explained the environmental consequences of growing more food in the usual ways, with fertilizers, pesticides, irrigation, mechanization, and a reliance on crops of a single, genetically uniform strain. Stephen Schneider of the National Center for Atmospheric Research offered a way out of the dilemma we face in choosing between economic development for the Third World and the environmental consequences of that development.

This essay draws chiefly on those presentations but also on some supporting materials. It is intended to bring current thinking about population, resource, and environmental issues as expressed at Wingspread to a wider audience than could attend the gathering.

Dimensions of Population Growth

Regardless of their respective topics, the Wingspread speakers agreed on one thing: that world population growth must be curbed as rapidly as possible. Many of the needs of the current population go unmet as it is. A larger population,

especially one that grows rapidly, will only worsen our present difficulties and may eventually make it impossible to cope at all.

Today, the world population of 4.7 billion is growing at about 1.8 percent a year, down from a peak of about 2 percent in the 1960s. Despite the slowing in growth rates, though, more people are added to the world every year than ever before because of the larger population base. As Kingsley Davis pointed out, the number of people added to the world's population every five years—365 million between 1975 and 1980—is not projected to peak until it reaches 442 million between 1995 and the year 2000 (see Figure 1).[1]

This growth takes place largely in the less developed regions—Asia, Africa, and Latin America. Indeed, 5 percent of the world's population—living in the 11 European countries listed in Table 1—are essentially at "zpg" (zero population growth). Another 20 countries, constituting nearly a fifth of the global population, are growing slowly, at under 1 percent a year. As different as Barbados and the Soviet Union, these countries all have birth rates low enough that their populations will stabilize by the next century if birth rates do not rise. Despite this, however, population increases in the large countries in this group are still substantial (see Table 2), and wealth in some of these countries makes their contributions to global resource depletion and waste disproportionate to their size.

Altogether, the more slowly growing countries account for under 10 percent of the annual increase in world population today, and this share will decline as the years go by. China, which represents over a fifth of the world's population, contributes not quite one fifth of the annual population increase today. If birth rates fall according to plan in China, population will stop growing there in the year 2000. If birth rates fall more slowly, however, which is very likely, world population growth will be greatly increased because of China's enormous size.

TABLE 1
Countries At Zero Population Growth (Natural Increase Under 0.2 Percent in 1983)

Austria	Italy
Belgium	Luxembourg
Denmark	Sweden
Germany, East	Switzerland
Germany, West	United Kingdom
Hungary	

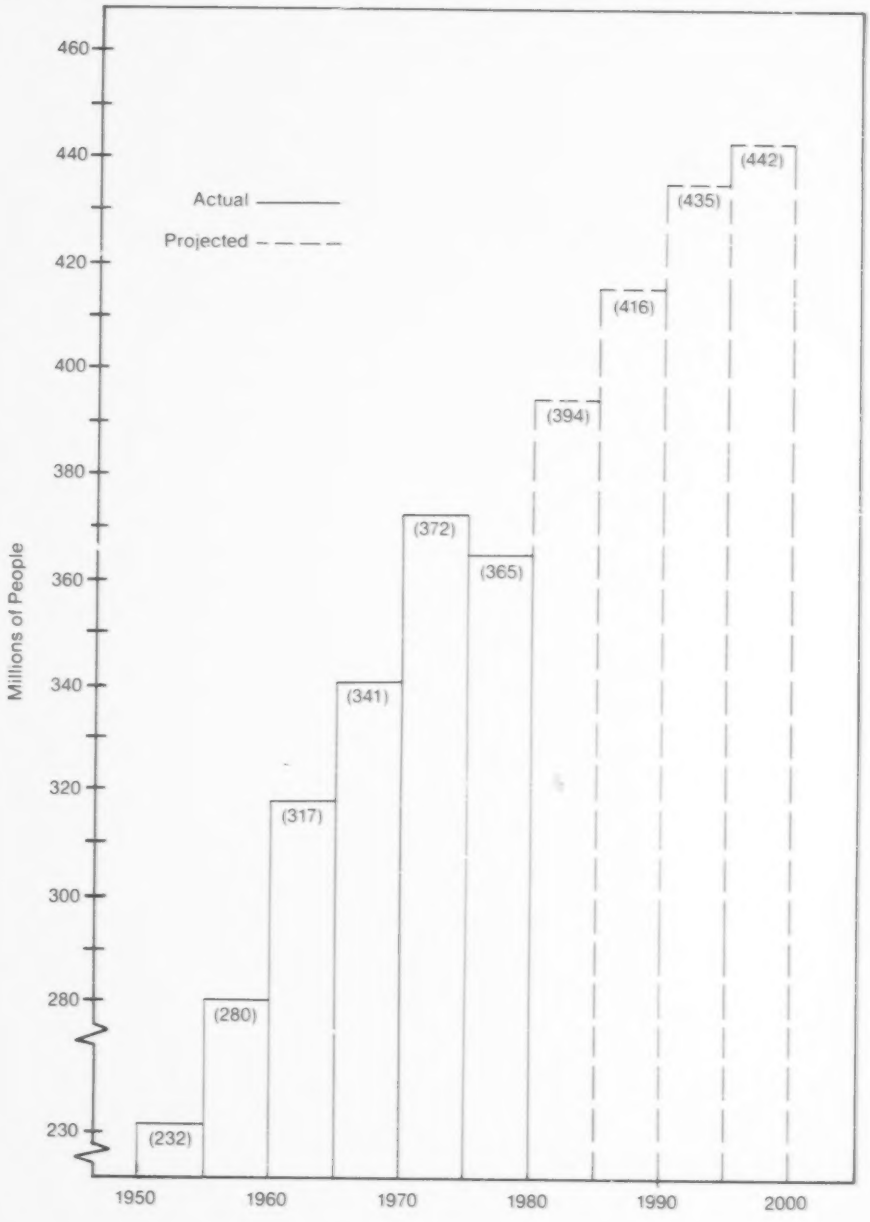
Source: Population Reference Bureau

Thus efforts to curb world population increase are most sensibly focused on the rest of the developing world, where half the world's people live but where almost three-quarters of the increase in world population today occurs. By the year 2000, these countries will contribute 77 percent of the annual population increase if the modest fertility declines projected by the United Nations materialize. Unless fertility falls very rapidly, however, most of the countries in this group will experience enormous population increases over the next few decades.

Nearly half the developing world's people and more than a third of the world's population live in countries where women on average have five or more children during their lifetimes (see Table 3). In these countries, a small fraction of couples use contraception, and birth rates have declined little if at all. The large populations of just three nations—India, Bangladesh, and Pakistan—make up more than half this group.

In countries with the highest birth rates, as many as one infant in seven dies before its first birthday, and families of eight and nine attempt to scratch a living from a few acres of overused land. Some have asserted over the years that the earth has a carrying capacity—a theoretical one—far in excess of the 4.7 billion who inhabit it today. That fact has been used to argue that population growth is not a problem. But these

Figure 1. Absolute Increase in World Population, Five-Year Intervals: 1950–2000



Sources: United Nations, Kingsley Davis

TABLE 2
Slowly Growing Countries
(Natural Increase Under 1 Percent in 1983)

Country	Annual Population Increase	Country	Annual Population Increase
Australia	138,000	Malta	2,400
Barbados	2,700	Netherlands	57,600
Bulgaria	26,700	New Zealand	25,600
Canada	199,200	Norway	12,300
Cuba	78,400	Portugal	59,400
Czechoslovakia	61,600	Romania	181,600
Finland	19,200	Spain	268,800
France	273,000	United States	1,639,400
Greece	59,400	Soviet Union	2,176,000
Japan	834,400	Yugoslavia	182,400

Source: Population Reference Bureau

theoretical arguments are cruelly irrelevant to the facts in many poor countries, the speakers agreed. Already, as Anne Ehrlich pointed out, 15 percent or more of the world's population is chronically undernourished, existing "constantly poised on the brink of starvation, vulnerable to any threat to their meager supply of food."[2] While many circumstances in addition to rapid population growth usually accompany hunger—poverty, lack of education, inadequate health care, and agricultural policies that do not encourage increases in subsistence crop production, for example—it will be difficult and costly to improve living standards of the needy among the world's current 4.7 billion; more population growth would only make an already awesome task more difficult.

Feeding Future Populations

In the year 2000, there are likely to be over six billion people in the world, and unless fertility declines are accelerated markedly in the next few years, the population will not stabilize until peaking in excess of ten billion. Just by the year 2000, if these projections materialize, there would be 45 percent more people in the Third World outside China than there were in 1983; food production would have to increase by at least that much just to maintain current levels of inadequately distributed food supplies. To feed the peak number of people in the world, annual global food production would have to be two to three times today's.[3] But there are physical, political, and financial reasons why such an increase is not assured, despite the unprecedented growth in food production that the world as a whole has enjoyed since World War II. Indeed, the very reasons for past successes in some parts of the world stand in the way of successes elsewhere.

Short-Term Obstacles: In 1950, it took a quarter of a hectare to grow the 248 kilograms of grain per person that was produced worldwide. By 1982, the world's farmers were growing 30 percent more than that per person and using only one- to two-tenths of a hectare to do it. Fertilizer, irrigation, mechanization, and pesti-

TABLE 3
Regions and Countries Where Families Average Five or More Children

Region or Country	Average Number of Children Per Family	Population (in millions)
Africa	6.5	513.0
Iraq	6.9	14.5
Saudi Arabia	7.2	10.4
Syria	7.3	9.7
North Yemen	6.8	5.7
Afghanistan	6.9	14.2
Bangladesh	6.2	96.5
Iran	6.4	42.5
Nepal	6.5	15.8
Pakistan	6.3	95.7
India	5.0	730.0
Burma	5.3	37.9
Guatemala	5.7	7.9
Haiti	5.5	5.7
Bolivia	6.6	5.9
Equador	5.7	8.8
Peru	5.0	19.2
Misc. Small Countries in Asia and Latin America	5.1-7.6	66.4
		TOTAL: 1,699.8

Source: Population Reference Bureau

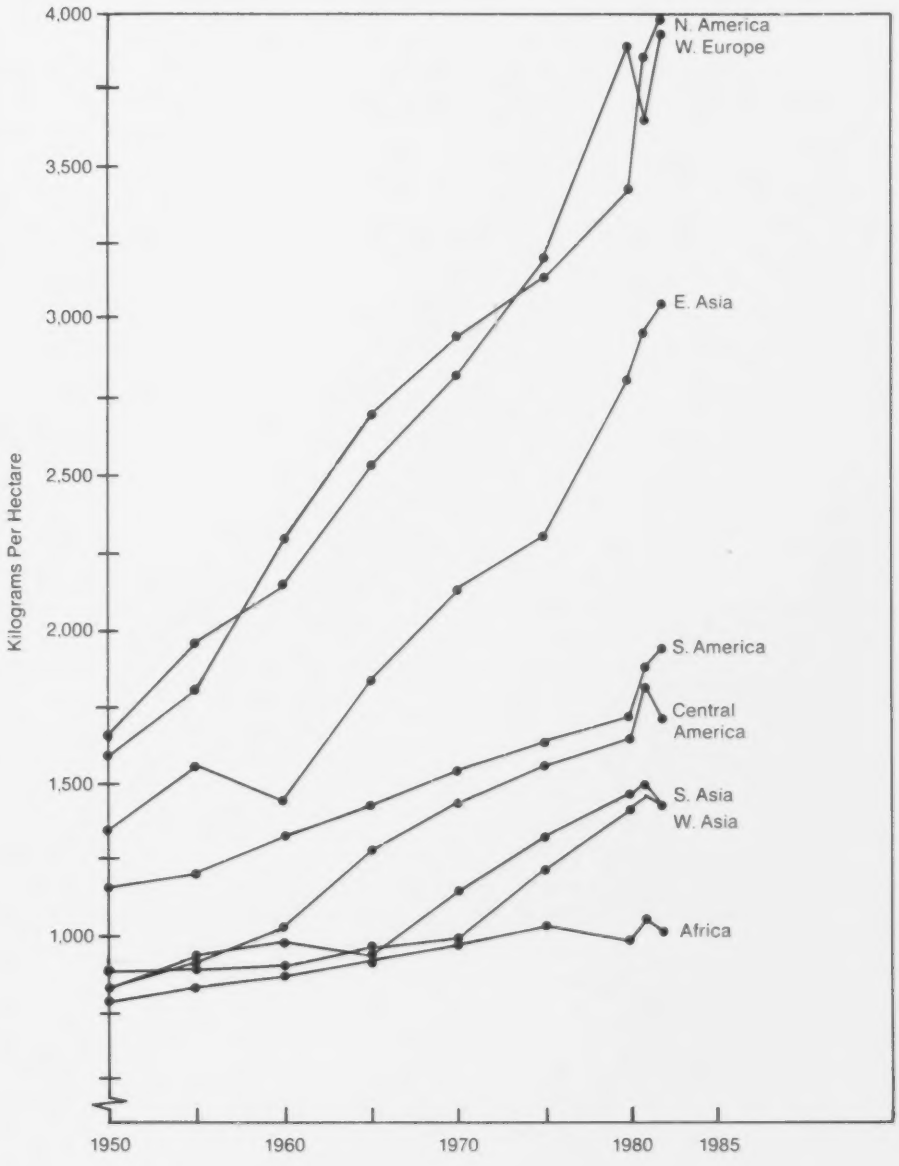
cides used with high-yielding seeds made this possible. In the 1950s and 1960s, most of the increase occurred in the developed world. The development of new, high-yielding varieties of rice, wheat, and corn in the 1970s brought higher yields to the Third World, too. This was the "Green Revolution."[4]

But the benefits of the Green Revolution did not reach everywhere. Grain yields, for example, are still low in most of the developing world compared with North America and Western Europe (see Figure 2). And the reasons the Green Revolution passed these areas by in the 1960s and 1970s stand in the way of future boosts in food production.

Some of the reasons for the failure of the Green Revolution in these areas are technical: some high-yielding varieties were not suited to local climates, for example, or fertilizers and pesticides were not available, even when farmers had the money to buy them. There were also social and political reasons, though, as Anne Ehrlich pointed out at Wingspread. Traditional farmers sometimes resisted the new seeds and farming methods, preferring instead to follow "tried and true" habits of the timing of planting and the choice of crops. Also, where agricultural policies hold down crop prices, farmers had little or no incentive to make investments that would raise production, and because much of the population of some countries is too poor to buy more food, the expanded output of farmers who used new seeds did not necessarily have a ready market.

A new and important deterrent to dramatically higher crop yields in the countries most in

Figure 2. Grain Yields, Selected Regions: 1950–1982



Source: U.S. Department of Agriculture

need of them today is the price of oil and its derivatives, which include fertilizer and pesticides. The price of gasoline, fertilizer, and pesticides deterred poor farmers from using these inputs even before the Arab oil embargo drove prices up; now, at many times the pre-1973 price, it will, if anything, *prohibit* poor farmers from using them today. Indeed, farmers in the industrialized West, wealthy by global standards, have, according to Ehrlich, "been switching to 'minimum tillage' or 'no-till' cultivation" since 1973, in part because of gasoline prices.

Where farmers cannot improve yields by adding expensive inputs, they must in future turn to additional acres to grow more food, as farmers did from the beginnings of agriculture until the modern era. But as both Ehrlich and Pimentel pointed out at Wingspread, no vast areas of productive land wait to be cultivated today; tropical regions once thought of as the agricultural frontier are found to be fragile ecosystems that require expensive inputs to grow crops for even a few years. After that, they can easily become exhausted. Other, less vast land areas that might be cropped are of lower quality than those currently planted, and their yields reflect it.

Competition for even that marginal land is heavy and is likely to intensify. Housing needs necessarily expand with a growing population—one that spreads, logically, onto farmlands that usually surround existing cities and towns. Land resources will become even more important in the future as the world turns to renewable energy as an alternative to expensive and, ultimately, scarce oil. Renewable energy technologies vary in the demand that they make on land; wind machines, solar collecters, and photovoltaic arrays are the least land-using. But raising crops such as corn or sugar cane to produce liquid fuels and damming rivers for hydropower can take enormous amounts of land—often prime farmland. Pimental said at Wingspread, for example, that at least nine times as much land is required to grow enough corn to distill into the ethanol that can fuel an average U.S. automobile for a year than is needed to feed one person.

While competition for the world's limited supply of cropland is intensifying, in the aggregate the world's farmers are experiencing diminishing returns from one of the primary substitutes for additional acres—chemical fertilizer. Pimentel cited Lester Brown of Worldwatch Institute, who has documented these trends: in the early 1950s the application of an additional ton of chemical fertilizer yielded nearly 15 additional tons of grain for the global harvest; by 1980, this figure had fallen to just under 6 tons.[5] At the Wingspread Conference, Pimentel pointed out that doubling the food supply during the next 25 years "would help offset the serious conditions of malnourishment that 500 million humans presently endure." But to do this "would require a three- to four-fold increase in the total quantity of energy (including fertilizer) expended for food production," because of diminishing returns.

The immediate barriers to expanding food production include the limited availability of agricultural land, diminishing returns from additional inputs of fertilizer and other energy-intensive materials, and the inability of the neediest farmers to make use of yield-enhancing techniques. But overcoming these technical, financial, and political barriers—"succeeding" in feeding the world—could, ironically, be a larger failure in the long run if the world's farmers accomplish the task in the same way it has been done in the recent past. Indeed, boosting the earth's carrying capacity unwisely may erode it in the long term.

Eroding Long-Term Carrying Capacity: An heir spending all of an inheritance is richer more immediately than if the inheritance is invested and the person lives indefinitely on the income earned. But the heir is poorer—poor, in fact, for all time—once the inheritance is spent.

The world faces an analogous, though much more complex, situation as it manages its agricultural resources to feed, house, and clothe its

population. In an effort to grow more, the world's farmers are using up resource endowments—their "inheritance," in effect—in two ways. First, fossil energy in the form of fertilizer and pesticides derived from oil and natural gas and in the form of fuel to power farm machinery and irrigation pumps is being used to boost production. But fossil fuel supplies will eventually be depleted, and the additional productivity these inputs yield is a temporary gain. Second, and more subtly, farming as it is practiced today can diminish long-term agricultural productivity because economic and population pressures discourage good stewardship of the land. And used improperly, high-energy inputs can exacerbate the damage to the earth's "inheritance" of fertile land.

At Wingspread, both Anne Ehrlich and David Pimentel discussed how long-term agricultural productivity is being eroded.

Soil Erosion: A primary difference between a barren planet and the fertile earth is a thin layer of broken-up rock mixed with plant and animal matter, inhabited by tiny organisms: topsoil. As it has for centuries, the earth's topsoil is washing and blowing away. This is partly inevitable: sloping fields will erode. But erosion has accelerated in recent years. Third World farmers, forced by economic and population pressures, are moving onto lands not suited for cultivation, such as steep hillsides, and they are shortening fallow periods on lands once planted to soil-holding cover for periods between crops. Farmers in the developed world—and Third World farmers with access to modern techniques—are also moving onto more erodible, marginal lands. But they accelerate erosion, too, with machines and chemicals that change soil structure and hasten its washing and blowing away.

Pimentel pointed out that in the United States today nearly 200 million acres of farmland has either been "totally ruined for crop production or has been so seriously eroded that it is only marginally suited for crop production." As much as a third of U.S. farmland is being eroded at a rate that undermines soil fertility. Fertilizers and other energy inputs have largely masked the reduction of yields that is inevitable when rich topsoil erodes, though productivity losses are being experienced on some U.S. farmlands already.

Erosion rates in the Third World are nearly double those in developed countries, according to Pimentel, and resources such as fertilizers for offsetting this degradation are not as available. In some areas, farmers are already realizing that their exhausted fields mean the "hungry season" between harvests is lengthening, as those harvests fill less of the grain bins every year.

Misuse of Irrigation: Bringing water to fertile but naturally dry farmland has contributed significantly to expanded food production around the globe since World War II. Indeed, irrigation water, along with fertilizers, pesticides, high-yield grains, and mechanization, has served as a substitute for additional cropland as farmers have succeeded in growing ever more on each acre.

But irrigation has a number of adverse consequences and, as it is practiced in many areas of the world today, cannot continue indefinitely. Irrigation from groundwater lowers the water table if it is pumped at a rate higher than that of the net natural recharge rate. Already, farmers over the Ogallala Aquifer in parts of the U.S. Great Plains have turned off irrigation pumps as the cost of pumping from so deep has exceeded the profit that could be earned from the irrigated crop.

Whether pumped from underground aquifers or diverted from rivers and streams, irrigation water can eventually damage the land it first makes more fertile, by waterlogging and salinization. As irrigation water percolates back into the ground, it can raise the water table to upper layers of the soil, becoming toxic to plants. Furthermore, evaporation from the surface deposits salt from the irrigation water in the soil, damaging fertility. At least half the world's irrigated land—15 percent of the world's cropland is irrigated—has been damaged to some degree by waterlogging or salt buildup, according to

Anne Ehrlich. Without costly correction strategies, these areas will eventually become wasteland. Some already has: Indian analysts report that "nearly seven million hectares of land have already gone out of production because of severe salinity" in India. Another quarter of the 40 million hectares of cropland currently irrigated in India "are threatened by waterlogging and salinity and are in urgent need of attention if they are not to go out of production in the near future."[6]

Altering Natural Ecosystems: Highly productive farms are essentially simplified, human-designed systems superimposed on complicated, natural ecosystems, as Anne Ehrlich pointed out at Wingspread. Rows of crops are highly artificial plant systems that depend for maximum production on fertilizer, mechanized tillage and harvesting, and protection from diseases and pests.

But this productivity comes at a price. Fertilizers and pesticides can poison in their own right, damaging fisheries, polluting water, and affecting the health of farmworkers and consumers. The use of pesticides, too, actually leads in some cases to worse pest problems in the long run, as pest populations quickly develop resistance to new pesticides. The use of large and heavy machinery can alter soil structure through compaction, but also contributes to soil erosion. As Ehrlich pointed out at the Conference, "in the United States, some soil conservation measures (such as windbreaks and contour planting) have been abandoned by farmers because they are incompatible with the use of huge machines."

Replacing a complex natural system with a simplified one also changes the natural system's effect on many things, including the atmosphere, climate, and weather; the cycling of nutrients through the environment; the processing of wastes; and the control of pests and diseases. Anne Ehrlich noted at the Wingspread Conference, for example, that deforestation—the chief cause of which is the clearing of land for agriculture around the world—typically leads to increased problems with floods and droughts in adjacent areas, reduced recharge of aquifers, and accelerated soil erosion; it probably also leads to a warmer and drier local climate. These results ordinarily follow deforestation anywhere, but they tend to be accentuated in the tropics. A similar set of problems attends desertification from overcultivation or overgrazing.

The simplification and destabilization of ecosystems caused by their conversion to agriculture is compounded by planting the cleared natural areas with single-strain crops. Indeed, "a handful of new, genetically quite uniform varieties" of the worlds's major crops—primarily wheat, rice, and corn—has replaced "hundreds to hundreds of thousands of varieties of traditionally grown strains," Ehrlich said at Wingspread. Farmers have adapted these diverse crop strains over thousands of years to local climates and soil conditions and to local pests and diseases. Planting a diversity of crops and crop varieties minimizes losses from an outbreak of pests, a crop disease, or an unfavorable change in weather. A particular disease, pest, or climatic condition to which a widely planted strain was vulnerable could wipe out that crop over very large areas. In 1970, for example, 15 percent of the U.S. corn crop was lost to a new strain of corn blight; in some areas, as much as half of the corn crop was destroyed, Ehrlich pointed out. The Irish potato famine starkly illustrates the consequences of depending on one crop: potatoes were a "Green Revolution" crop in their day for Ireland, because whole families could be fed from a single small plot of land. But in 1846, a potato blight damaged much of this sole food source for the Irish; eventually nearly two million people in Ireland starved to death.

The price, then, of highly productive farming as it is often practiced today can include soil erosion that depletes fertility; waterlogging and salinization that make it impossible to farm some acres at all; and the simplification of natural ecosystems that both depletes soil fertility and makes farming highly vulnerable to

changes in weather, pests, and crop diseases. These consequences counsel against wholesale conversion to similar farming techniques in the Third World, where modern inputs are not generally used. How, then, is the Third World to avoid chronically inadequate food supplies or continual dependence on food aid? Many alternatives were suggested by the speeches at Wingspread.

Per acre yields are currently so low in many parts of the developing world that small amounts of fertilizer or irrigation could boost yields dramatically in the near future. At the same time, more equitable distribution of land and other forms of wealth would enable the poor to invest more in their agriculture and ultimately to grow and buy more food. Farm policies that give farmers a good price for their crops would probably bolster production. Pricing policies, international assistance, and agricultural extension programs that encourage the development of many different kinds of crops, including indigenous legumes, roots, and tubers, would help feed more people. Ehrlich pointed out at the Conference that "when high-yielding rice or wheat is grown in place of beans, more calories but less protein and some other nutrients are produced." If cash crops like coffee or sugar are encouraged instead of food crops, the consequences can be worse.

The adequacy of food supplies now and in the future tells a good deal about whether the basic subsistence needs of a country's population are being and can be met. As crucial as food is, though, more is at stake for the world's poor than food; energy consumption, particularly of fossil fuels, reveals much about overall economic development and improvements in living standards, and it captures the intensity—and probable adequacy—of food production, as well. Stephen Schneider talked at Wingspread about world development in general as reflected in fossil fuel use.

Energy for Development

Today the developing world uses relatively little petroleum or the other fossil fuels, natural gas and coal. Indeed, the Third World, where three-fourths of the world's people live, uses only one-fourth of the world's oil, the dominant fuel. A number of developing countries use less than a single barrel of oil per person a year, while some rich nations use as much as 20 barrels per person annually.[8] As Kingsley Davis pointed out at the Conference, between 1960 and 1979, the world's wealthiest economies increased their per capita consumption of fossil fuels 33 times more than the poorest countries did.

By far the majority of people living in the developing world have little to do with fossil fuels; they rely on fuelwood, dung, and valuable crop residues to cook food and heat water. Indeed, the need for biomass has been called "the other energy crisis"; the poor in much of the Third World scour the landscape for every twig, leaf, and burnable scrap, and the countryside has severely deteriorated. The use of fossil fuels is creating a crisis of less immediate, but truly global, proportions. Acid rain, which damages inland fisheries and streams as well as lake ecosystems and which may damage forests, is closely linked to the burning of fossil fuels. The combustion of such fuels, and of coal in particular, also releases carbon dioxide into the atmosphere. The accumulation of excess carbon dioxide traps heat near the earth's surface; this process, called the "greenhouse effect," may warm the earth's atmosphere enough by the middle of the next century to create warmer and drier conditions in now-verdant farming areas and to raise sea levels enough to flood lowlands throughout the world.[9]

Scientists have said that temperature increases sufficient to affect the ice caps could occur unless there is no growth in world energy use over the next century and the use of coal is

phased out.[10] But closing the global gap in fossil fuel consumption between the rich and poor nations is likely to increase total consumption, particularly if conservation in the developed world progresses slowly. Indeed, a complete and immediate redistribution of total world oil production would give each person in the world four barrels of oil a year, much closer to the current levels in developing countries than in the developed ones.[11] Should developing countries therefore be encouraged *not* to increase their use of fossil fuels, which, in addition to perpetuating the current wide disparity in resource use between the rich and the poor, would probably slow economic growth in the developing world? Or should the Third World move ahead as fast as it can to consume more fossil fuels in the name of economic development, regardless of the environmental consequences?

Schneider offered a way to choose between these two "bad" alternatives. Developing countries should increase per capita consumption of fossil fuels, he said, if it brings about development that can lower birth rates, even though carbon dioxide accumulation and other pollution problems worsen in the interim. Schneider "would be able to accept a little additional pollution now if it meant that ultimately the world population would stabilize sooner and thus future pollution levels would be lower for any per capita standard of consumption" in the world.

High energy consumption is historically associated with wealth. Beyond a certain consumption level, more energy means not wealth but waste; both Sweden and Switzerland, for example, have higher gross national products per capita than the United States, which uses much more energy per capita than either of these two countries.[12] But for the developing world today, increasing energy use "would still bring marginal returns in terms of GNP growth," Schneider said at Wingspread.

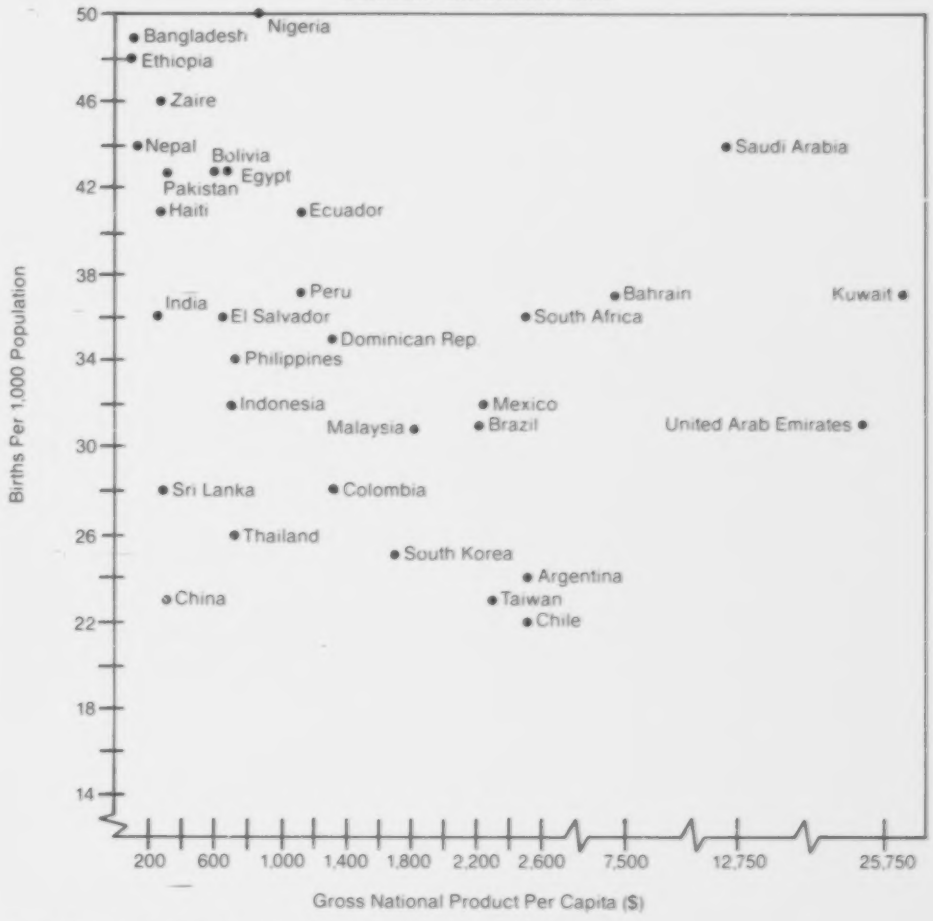
But the use of additional fossil fuels will be worth the price in pollution only if it buys development that lowers birth rates. Otherwise, the world will repeat history's mistakes: more population, consuming more, will only mean more pollution. How can we ensure that higher energy consumption brings development to the Third World that encourages a reduction in birth rates?

More energy usually means a higher gross national product and, by definition, a higher GNP per capita. But more GNP per capita does not necessarily mean lower birth rates in poor countries, as Figure 3 shows. And more GNP per capita does not necessarily mean a better standard of living, as Schneider pointed out in a discussion of the Physical Quality of Life Index (the PQLI).

The PQLI is a number composed of the infant mortality rate, life expectancy, and literacy rate in a country. Each country's rate is compared to the highest and lowest achieved anywhere in the world and assigned a number indexing it to those values. The three numbers are then averaged, with each given equal weight. In the early 1970s, PQLIs around the world ranged from a low of 12 in Guinea-Bissau to a high of 97 in Sweden.

Figure 4 shows that countries with similar PQLIs can have very different incomes per capita. Arab countries, for example, have relatively low PQLIs, even though the per capita GNP in OPEC Arab countries is as much as ten times as high as in non-OPEC Arab countries. In these nations, a rising gross national product does not necessarily raise the PQLI. In Latin American and Asian countries, the PQLI tends to increase as wealth increases. But for any given level of wealth, the PQLIs of Asian countries are higher than in other parts of the world. This may be because incomes are distributed more equitably in Asia than in other regions, according to Schneider. Regardless of the cause, it is clear that per capita GNP is not a reliable measure of well-being as measured by the PQLI.

Figure 3. Gross National Products Per Capita and Birth Rates, Selected Countries: 1983

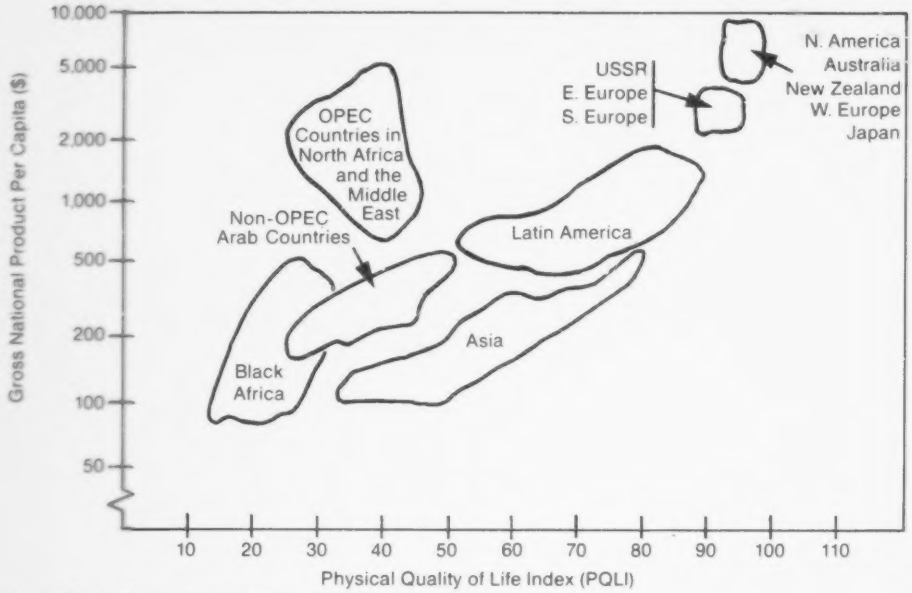


Source: Population Reference Bureau, updating Schneider

There is a close relationship, however, between PQLI and birth rates (see Figure 5), which suggests that countries putting money into strategies that reduce infant mortality, that lengthen people's lives, and that promote literacy are investing in reductions in birth rates. Thus, Schneider concludes that to reduce quickly "LDC birth rates without draconian measures, development strategies must concentrate on bringing up the PQLI, not just raising overall national GNP."

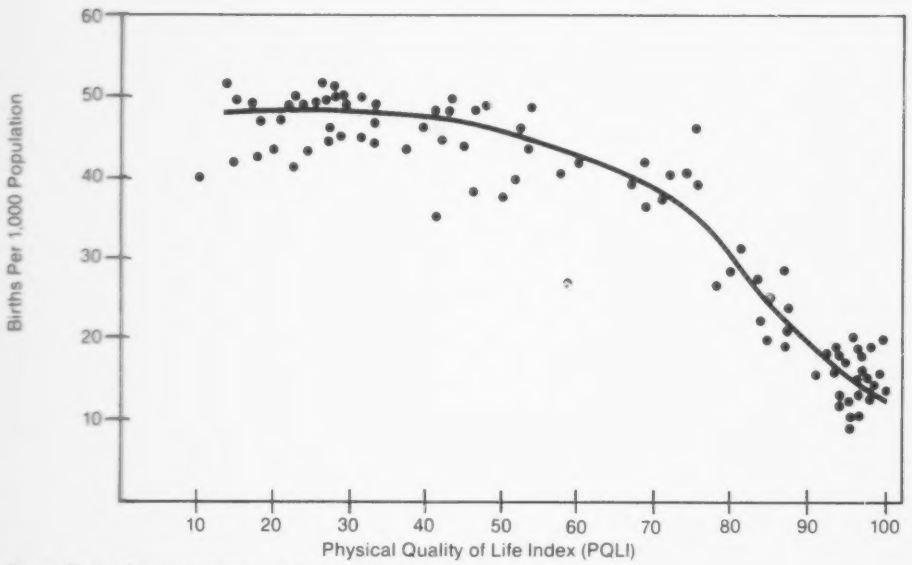
Schneider concludes that bringing up the quality of life and bringing down birth rates in the developing world is worth a relatively small increase in carbon dioxide and acid rain, because the benefits of a lower, stable population size as soon as possible are greater than the risks from marginally more pollution during the transition. For the gamble to be worth it, though, it must be taken now. Delay pays an enormous price in ultimate world population size and total damage from pollution. During

Figure 4. PQLIs and Gross National Products Per Capita, Early 1970s



Source: Stephen Schneider, from Harrison Brown and Morris Morris.

Figure 5. PQLIs and Birth Rates: Early 1970s



Source: Stephen Schneider, from Harrison Brown and Morris Morris.

the transition, too, Schneider pointed out at Wingspread, energy conservation and the development of alternatives to fossil fuels should be subsidized heavily. Reducing waste maximizes the amount of progress that can be attained at the cost of a given amount of pollution; alternatives to fossil fuels are necessary for a sustainable society in the future.

Policy Choices

Everyone speaking at Wingspread agreed that the most important element of bringing about a sustainable world in the long term is curbing population growth. Policies for encouraging a transition to a sustainable society cannot ignore fertility and population growth.

The world population today is 4.7 billion. Even if starting tomorrow the world's couples had no more than two children on average, or just enough to replace themselves, the world population would grow to 7 billion before stabilizing.[14] This is because there are so many young people around the world not yet in their childbearing years. Thus fertility must fall rapidly to prevent the peak population from greatly exceeding 7 billion. How can that be done?

Population growth slowed in Europe and North America as those regions industrialized. This change is called the "demographic transition" and is offered as proof that industrialization will also bring birth rates down in developing countries. But as Kingsley Davis pointed out at Wingspread, modernization that brings wealth such as industrial countries have is a slow process; "in the meantime, the population builds up to the point of interfering with modernization." That phenomenon is already occurring. Rapid population growth, combined with slowly growing or even contracting economies, is preventing per capita economic gains in some countries of the developing world today.[15] Those unrealized gains are the very ones that are supposed to reduce population growth.

Even if a demographic transition could bring birth rates down in the Third World it could not do so fast enough to prevent enormous projected increases in population, most often in countries least equipped to cope. Unless there is an unexpectedly rapid birth rate decline in Bangladesh, Pakistan, and the sub-Saharan African countries, for example, populations in those areas are projected to triple or even quadruple before they stop growing.[16] These countries are already on the margin of survival; it seems unlikely that even a doubled population could be supported for any significant length of time.

Kingsley Davis offered another reason why a demographic transition will probably not occur to bring down birth rates in the developing world: the situation there is fundamentally different from what it was for the now-advanced nations when they were going through the transition. The less developed countries today have a more rapid population growth rate—and larger absolute additions to their populations every year—than the industrial nations did at a similar stage. But the developing world lacks the frontiers that the United States, Australia, and New Zealand provided to migrating European populations—and to Americans migrating West—in the nineteenth and early twentieth centuries. There is also no resource frontier for developing countries similar to the one they provided colonial powers in earlier days. As a result, land resources in the Third World are strained today as they never were in the now-developed world.

Davis concludes that incentives and disincentives that compete with traditions encouraging large families are essential for birth rates to fall in the Third World. Family planning without incentives allows couples to have the number of children they want, Davis pointed out, which is usually too many for rapid population stabilization.

Combining Davis's recommendation on incentives with Schneider's on Third World

development suggests some strategies that could be financed in the Third World. These are family planning incentives designed to promote economic development and to raise the PQLI. These population policies are, in effect, development projects to lower birth rates.

Any project that creates employment in a Third World country—whether heavy industry, light manufacturing, public works, or a network of cottage industries—provides an opportunity to reduce birth rates. Literacy classes and health care, particularly services designed to improve infant health, can be offered in the workplace. Contraception can be readily available, free, and encouraged with incentives. Pension plans can encourage smaller families indirectly by substituting for child-provided old-age support; they can also be fashioned to compensate workers with two children more generously than workers with larger families. These kinds of projects could also be tried on the village level. Development that also lowers fertility can be promoted in a number of ways, often without increasing fossil fuel consumption on the scale that industrialization does. Villages can be rewarded with development projects—a well, irrigation, a diesel pump, livestock, a biogas plant, a school, roads, parasite control, or low-interest loans—as fertility falls or as more and more villagers use family planning.[17]

Curbing population growth is one of two efforts necessary to bring about a sustainable way of life on earth. The other is reducing consumption in the developed world. The disparity in food consumption between the rich and poor is widely known and documented; both Ehrlich and Pimentel spoke of it at the Conference. Changes in the diets of the wealthy could help relieve some of the stresses on agricultural resources discussed at Wingspread. Decreased demand would allow land, water, energy, fertilizers, and pesticides to be used less intensively. But, as Ehrlich pointed out at the Conference, "nothing short of a virtual reordering of the global political and economic system would be required for the people of the rich countries to reduce substantially their dependence on animal protein."

Less radical adjustments are possible in many other areas of affluent life that would significantly reduce environmental stress without enormous sacrifice—more energy-efficient cars and houses; land-use planning that avoids urban sprawl; pricing and using water for conservation, for example. Just improving efficiency in the use of energy and materials in known ways could stretch resources and reduce pollution a good deal. More research on greater efficiencies would accomplish even more.

Many of the characteristics of a sustainable society were discussed at Wingspread: building energy-efficient homes; developing crop strains that are energy- and water-efficient; widespread family planning services, to mention just a few. The complexity of the problems discussed at the Conference and the overlap among subject areas—food production, energy production and use, environmental quality, family planning, economic growth—suggest the complexity of the remedies required. The world cannot afford to delay in applying known remedies and should be searching actively for new remedies. David Pimentel articulated the alternative to bringing our use of resources into balance with the earth's long-term productivity: if we do not, he warned, "then nature will."

Footnotes

1. Population figures in this paragraph and throughout the essay, unless otherwise stated, are from Population Reference Bureau, *1983 World Population Data Sheet* (Washington, D.C.: 1983) and United Nations, *World Population Prospects as Assessed in 1980* (New York: 1981).
2. Presentation by Anne Ehrlich, Wingspread Conference, Racine, Wisconsin, March 6-8, 1983. Hereinafter, obvious references to presentations at the Conference will not be footnoted. Materials presented by one of the speakers not identified in the text will be footnoted as Ehrlich, Davis, Pimental, or Schneider.
3. Ehrlich.
4. Grain and acreage figures are from Lester R. Brown, *Population Policies for a New Economic Era* (Washington, D.C.: Worldwatch Institute, March 1983), pp. 10-11.
5. Ibid.
6. Centre for Science and Environment, *The State of India's Environment 1982: A Citizen's Report* (New Delhi: 1982), pp. 6-7.
7. Irish potato famine example is from Stephen H. Schneider and Randie F. Londer, *The Coevolution of Climate and Life* (San Francisco: Sierra Club Books, in press).
8. Figures on oil use in developing countries are from Daniel Deudney and Christopher Flavin, *Renewable Energy: The Power to Choose* (New York: W.W. Norton & Company, 1983), p. 11.
9. Explanation of greenhouse effect and acid rain is drawn from Schneider and Londer, *Coevolution of Climate and Life*.
10. J. Hansen et al., "Climate Impact of Increasing Atmospheric Carbon Dioxide," *Science*, August 28, 1981, p. 957.
11. Brown, *Population Policies*, p. 8.
12. This and other facts in this section are from Schneider unless otherwise indicated.
13. Morris D. Morris, *Measuring the Condition of the World's Poor: The Physical Quality of Life Index* (New York: Pergamon Press, 1979), pp. 128 and 134.
14. See, e.g., Tomas Frejka, "Long-Term Prospects for World Population Growth," *Population and Development Review*, September 1981.
15. See, e.g., World Bank, *World Development Report 1982* (Washington, D.C.: 1982).
16. Projected population increase if fertility does not decline rapidly is from computer projections provided by Tomas Frejka, The Population Council, New York.
17. See Judith Jacobsen, *Promoting Population Stabilization: Incentives for Small Families* (Washington, D.C.: Worldwatch Institute, June 1983) for a discussion of incentives in family planning programs.

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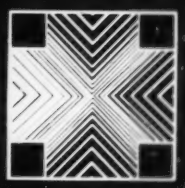

Death and Taxes:
The Public Policy Impact of Living Longer

Death and Taxes: The Public Policy Impact of Living Longer is the fifth in a series of occasional papers, *Population Trends and Public Policy*, published by the Population Reference Bureau, Inc. This series is devoted to a discussion of demographic issues of concern to policymakers.

This report was adapted from the following papers and discussions prepared for the session, *The Future of American Mortality: Social, Biological, and Policy Aspects*, at the Annual Meetings of the American Association for the Advancement of Science, May 1983:

- *The Future of American Mortality: Introduction and Overview*, by Thomas J. Espenshade, The Urban Institute, 2100 M St., N.W., Washington, D.C.
- *Life Expectancy and the Older Population: Demographic Implications of Recent and Prospective Trends in Old Age Mortality*, by Eileen M. Crimmins, Andrus Gerontology Center, University of Southern California, Los Angeles, California.
- *The Impact of Biomedical Accomplishments on Life Expectation and Life Span*, by Leonard Hayflick, Center for Gerontological Studies, University of Florida, Gainesville, Florida.
- *Death and Taxes: The Fiscal Implications of Future Reductions in Mortality*, by Barbara Boyle Torrey and Douglas Norwood, Office of Management and Budget, New Executive Office Building, 726 Jackson Place, Washington, D.C. (Views represent authors' opinion, do not reflect Administration policy.)

Discussants:

- *Scrutinizing the Assumptions*, Lois M. Verbrugge, Institute of Gerontology and Institute for Social Research, University of Michigan, Ann Arbor, Michigan.
- *Future of American Mortality*, by Charles B. Nam, Center for the Study of Population, Florida State University, Tallahassee, Florida.

Each of these authors contributed to the preparation of this issue of *Population Trends and Public Policy*. For copies of the original papers, please contact the authors directly. Copies of this issue and others in this series may be ordered from the Circulation Department of the Population Reference Bureau, Inc., P.O. Box 35012, Washington, D.C. 20013, at $3 per single copy; 2-10 copies, $2.30 each; 11-50 copies, $1.90 each; 51 or more, $1.50 each. Orders of $20 or less must be prepaid and include $1 for postage and handling.

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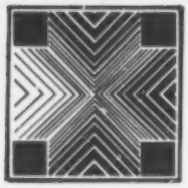


Death and Taxes:
The Public Policy Impact of Living Longer

In Summary

Since the late 1960s, life expectancy among the elderly in the United States has increased at historically unprecedented rates. Thanks primarily to a drop in deaths due to heart disease, life expectancy at birth leaped from 70.2 in 1965 to 73.7 in 1980. In 1983, life expectancy at birth stood at 74.5 years—70.8 years for men and 82.2 years for women.

By the year 2000 many experts believe life expectancy for U.S. citizens could be as high as 80 years—74 years for men and 86 for women. While these remarkable advances mean we can all look forward to longer lives, their impact on society and on the current system of public programs for the elderly could be disastrous.

This report analyzes these life expectancy trends based on research first discussed at the 1983 meeting of the American Association for the Advancement of Science. Various aspects of the anticipated "senior-citizen boom" are examined from a policymaker's perspective.

• **Projecting the size of the elderly population.** Americans are living longer than anticipated even ten years ago. The Social Security Administration's life expectancy projections, made during the 1970s, have been subject to revision and re-revision. Current projections assume that U.S. life expectancy will continue to increase at some fraction of the 1970s' rates, which surprised both demographers and actuaries. Unforeseeable events such as outbreaks of new diseases, increases in cancer from environmental pollution, or catastrophes such as nuclear war are not reflected in the projections.

All projections of the future growth of the elderly population between now and 2000 are similar, allowing a relatively narrow range in which to plan. After 2000 a much wider range in the size and age of the elderly population must be considered.

• **Focusing federal research dollars on slowing the aging process.** Federally-funded research on heart disease and cancer has played an important role in declines in mortality. Yet life span—the maximum age attainable—has been left unaltered. More and more Americans can expect to celebrate their 100th birthday, but not many more birthdays afterward. While death is delayed, aging is not. Federal research dollars directed toward heart disease and cancer outnumber funds for gerontology 20-to-1. Policymakers may be helping medical science achieve the dubious goal of keeping people alive well beyond their years of vigor. Striking a balance between research directed toward eliminating the major diseases and toward slowing the aging process is suggested.

• **Anticipating future federal costs.** Today the federal government is spending 27 percent of its yearly budget (an estimated $218 billion) on people 65 and over. This proportion could grow to an estimated 50 percent of the federal budget by 2025.

The increases in life expectancy will affect the cost of Veteran's Administration programs and federal employee retirement plans. Some federal retirement plans have not incorporated the increases in life expectancy of the 1970s, leaving them unprepared for future costs.

Women are expected to continue to live longer than men. Women who are single or widowed are more likely to be poor than any other group among the elderly. Focusing research on diseases which disproportionately kill men could allow men to live longer and continue to provide for their wives, as well as receive a better return on their Social Security investment.

Recent Trends In Life Expectancy

Of the proverbial "death and taxes," only the latter can be evaded. Therefore, it is natural for all of us to be concerned with our survival prospects, and for the scientific establishment to be curious about the patterns of human mortality and the factors that influence them.

Future changes in the overall U.S. mortality rate will depend chiefly on what happens to mortality rates at age 65 and above. Mortality rates at these ages also will determine the number of older people for many years to come.

In turn, the number of persons 65 and over will be the major component affecting the future cost of government sponsored programs for the elderly, such as Social Security and Medicare, and will be a large factor in the future demand for health care personnel and facilities. Older people often depend on informal networks of friends and family for support; hence their numbers will shape a variety of demands placed on society.

Most deaths in the U.S. today occur among the elderly. In 1980, almost 70 percent of all deaths in the U.S. were to those 65 or above. If mortality were to remain at 1980 levels, 77 percent of children born today would survive to age 65.

While death now is concentrated in the older ages, death rates at these ages have declined rapidly in recent years. A number of researchers have documented and described this recent decline in mortality among the elderly. Research by Eileen Crimmins has shown that death rates have declined between 1970 and 1977 among both sexes and throughout all the older age groups, ranging from 4 percent for males over age 85 to 16 percent for females between ages 65 and 75. In addition, researchers have noted that the rate of the recent mortality decline is historically unprecedented among a nation's elderly. Advancements in the treatment of heart disease are largely responsible for this decline.

To illustrate the extent of the 1970 to 1977 mortality decline, Crimmins broke the population ages 85 to 99 into five year age groups. (Usually these ages are grouped into one category because data are unreliable.) She found the mortality decline ranged from 8 to 15 percent, well within the range of decline experienced by ages 65 to 84 during that same period. Although caution in using these data must be stressed, they do suggest that significant declines in old age mortality occurred between 1970 and 1977 throughout the entire age range from 65 to 99.

The recent declines have far reaching implications for those involved in projecting the population or planning for the future needs of the elderly. The dramatic impact of the recent mortality decline can best be appreciated by reviewing projections made before this decline was noted.

Projecting Life Expectancy: Past and Present

Death rates at older ages have declined so rapidly in recent years that official life expectancy projections from the Social Security Administration (SSA) have had to be revised upward on practically a yearly basis. In 1974 the SSA projected life expectancy at birth by the year 2000 to be 69 years for males and 76.9 years for females. By 1980, that projection for the year 2000 had already been surpassed; life expectancy was 69.8 for males and 77.7 for females.

More recent projections by Social Security Administration actuaries, however, prepared since 1981, reflect the mortality declines of the

1970s (see Figure 1). Three projections are made assuming a high, moderate and low mortality rate. The major difference between projections made in the early 1970s and those made recently is the assumption that deaths from heart disease and strokes will continue to decrease for the next 25 years at rates similar to those recently experienced.

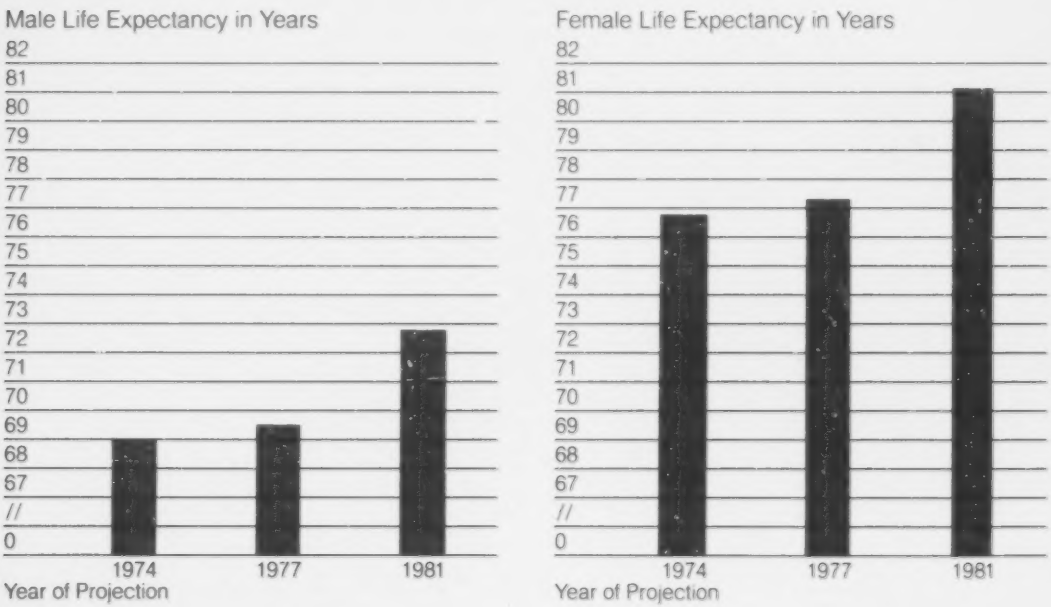
Earlier projections, based on trends prior to 1970, assumed we had almost reached the point where improving life expectancy was no longer possible. This belief was held for a number of reasons. Between 1954 and 1968 there was very little improvement in mortality across the entire age range. Nonviolent death was caused almost totally by chronic diseases, such as strokes and cancer, and assumed to be untreatable without striking medical developments. In fact, the National Center for Health Statistics reported in 1971 that mortality from the major chronic diseases, heart disease and cancer, had been increasing in some age and sex groups.

The projections made during the 1980s assume the United States will continue to reduce death rates from chronic diseases at some substantial fraction of recent rates of decline. Additional perspective on these recent life expectancy projections can be gained by comparing them to projected life expectancy assuming 1) continuation of current trends, and 2) the elimination of certain causes of death.

1) If death rates continue to decline at the same rate which occurred during the 1970s, life expectancy at birth in 2000 would be 80.4, similar to the low official mortality projections made recently by the Social Security Administration for that year. Thus, the new official projections, if anything, tend to assume moderation of recent rates of improvement even over the next two decades.

2) The official high mortality projection anticipates an increase in life expectancy at birth by 2020 of about two years, comparable to the increase calculated if cancer deaths were eliminated.[1] The low mortality projection anticipates

Figure 1
Social Security Administration projections of life expectancy at birth in 2000 by sex, selected years



Source: ref. 1

an increase in life expectancy by 2050 similar to the gain calculated if heart disease deaths were eliminated.[2]

These comparisons make clear, says Crimmins, that those responsible for official mortality projections have answered the call for bolder projections and are projecting possible major increases in life expectancy at older ages. Some analysts might argue, however, that more extreme assumptions yielding even bolder projections could be considered as well.

On the other hand, Lois Verbrugge points out that these projections are based on the extrapolation of recent trends rather than on an understanding of the interaction of the social and biological factors involved. The more known about disease, the process of human aging, and the links between personal behavior, medical care, and disease, says Verbrugge, the better our explanations of the past and projections of the future will be.

Unanticipated Factors Affecting Future Mortality

From time to time new strains of apparently defunct diseases appear, as do previously uncharted infectious diseases such as AIDS and Legionnaire's Disease. Gains in controlling traditional infectious diseases have been so extensive that little additional improvement can be expected; whereas the possibility of an increase in deaths due to the appearance of newer, less-understood infections is real.

Heart disease rates increased for some time and then began a continual downward trend in the past decade or two. Improved medical procedures and some changes in lifestyle, especially exercise and diet, have played a role.

Cancer rates, on the other hand, generally have increased, although declines in specific types of cancer have occurred. Future cancer deaths cannot be predicted with certainty because modern society generates so many potential sources of cancer and the time lag between acquiring a cancer-causing condition and identifying the cancer may be 20, 30 or 40 years.

Environmental pollution from the use of certain chemicals in industrial processes and the careless disposal of toxic wastes threaten public health in numerous ways. Modern behavior extends those threats. Smoking has been identified as a major cause of cardiovascular diseases as well as cancer. Surveys now show higher proportions of young females have smok-

ing habits. This recent trend is bound to affect future death rates.

Several countries, most notably the U.S.S.R., have demonstrated that death rates that declined for a long stretch of time can turn upward again. Recent rises in infant mortality in the Soviet Union, as well as in adult mortality, have been attributed to a number of factors including pollution, alcoholism, and changes in government health care priorities.

The possibility of future military conflicts on the U.S. mainland looms great because the technology of warfare has made distance an almost irrelevant factor. The expanding threat of nuclear missiles (even on a limited basis) also means that the U.S. stands to lose large numbers of people if war takes place. Demographers who make population projections usually assume the absence of cataclysmic events. This assumption becomes less and less tenable with time, at least with regard to long-range projections.

Charles Nam suggests that projections of future mortality should anticipate the impact of modern technology, social behavior, and government policy. Some modern developments have led to reductions in mortality, he says, while others have the potential to increase it, and the balance of these will govern future mortality levels.

Size of the U.S. Elderly Population

The Census Bureau adapts the Social Security Administration's projections to project the size of the U.S. elderly population. The use of SSA projections in the recent past has led to conservatively low estimates of the size of the elderly population which the Census Bureau has been forced to update and increase regularly.

Past population projections have taken a fairly pessimistic view of future improvement in life expectancy. Also, from World War II through the late 1970s, population projections for the United States were made using three different fertility projections but only one mortality projection. Mortality was deemphasized in population projections because its role in determining the future age distribution of the total U.S. population was deemed small compared to that of fertility. Most of the emphasis was on the relative, rather than absolute, size of the older population.[3] Changes in relative size under varying mortality assumptions seem less dramatic than changes in absolute size. Only recently has increased emphasis on the costs of providing income and health care for the older popula-

Figure 2

Projected size of U.S. elderly population under three mortality assumptions

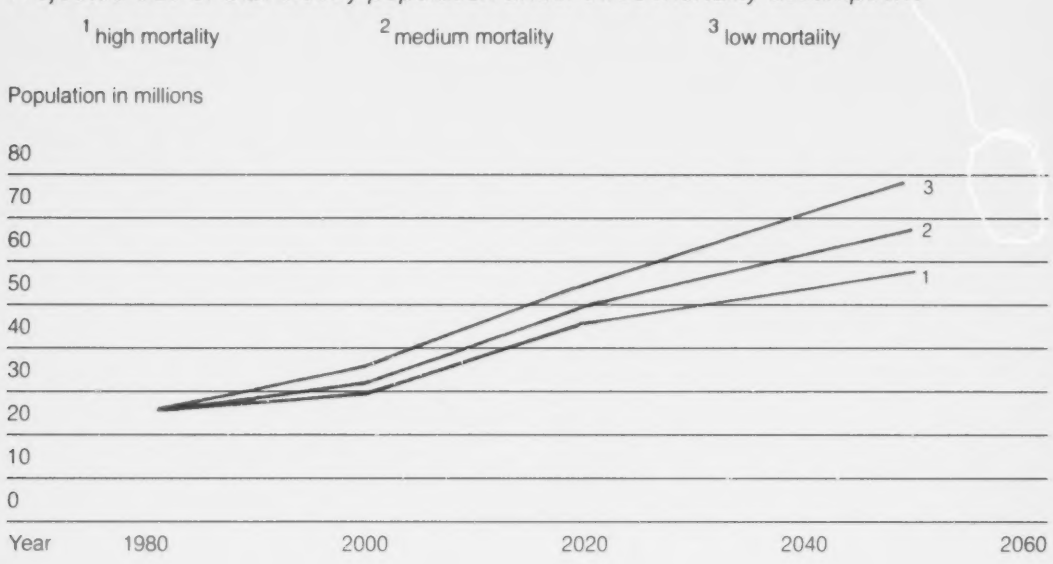


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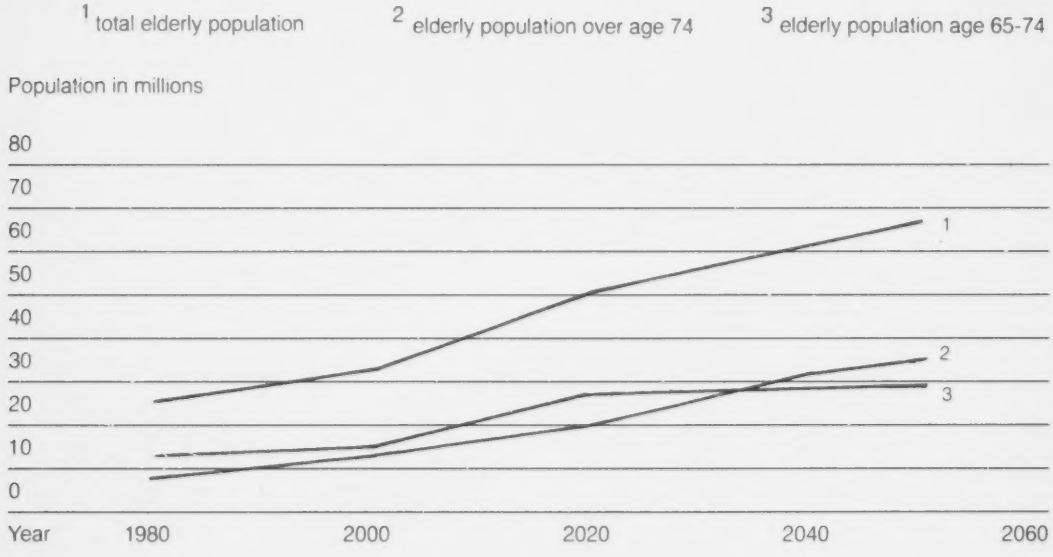
Figure 3

Projected size of the U.S. elderly population above and below 74 years of age, using medium mortality assumption



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tion led to heightened interest in the projected numbers of people 65 and over.

New Census Bureau population projections, made in 1982, answer some of the criticisms of earlier official projections and take into account recent trends (see Figure 2, page 7). These projections differ from earlier projections in that three projections of mortality as well as three projections of both fertility and immigration are made. The projected older population in 2000,

based on the new medium series for all three factors, is 35 million or 13 percent of the total U.S. population. This new projection of the U.S. elderly population in 2000 is 10 percent larger than the 1977 projection of 31 million and 24 percent larger than the 1967 projection of 28 million.

Under the three mortality scenarios of the new Census Bureau projections, the share of the population over 64 that is also over 74 will increase from 40 percent in 1981 to around 50 percent in 2000 (see Figure 3, page 7). Then by 2020, the average age of the older population will drop as the portion of the baby-boom generation born between 1946 and 1955 enters the 65 to 74 age group. By 2050 the trend toward increasing age of the older population will have resumed, with the proportion of the elderly population over 74 exceeding that in 2000.

Under all three scenarios the ratio of the projected population 65 and over to the working age population increases only slightly between 1981 and 2000, but then, increases sharply with time. Whereas at present there is roughly one retiree for every five persons of working age, by 2050 this ratio would become 1-to-3 under the high mortality assumption and almost 1-to-2 under the low mortality assumption. It should be noted, however, that the projections of the population age 21 to 64 beyond 2000 depend heavily on future fertility.

In general, the three new Census Bureau projections of the future size of the elderly population do not differ greatly in the short run, and planning to the year 2000 can be done with a relatively narrow range of options. Beyond the year 2000 a much wider range in the size and age of the elderly population must be considered.

All projections considered so far assume life expectancy will continue to improve, but differ in terms of how fast the improvement will occur. Exploring the limits to this improvement raises the possibility of extending life beyond the 100 to 110 year limit we are familiar with. Efforts to improve both the length and quality of life for the aged will affect both life expectancy and the numbers of elderly persons in the future.

Prospects for Extending Human Life

If a 20-year-old and a 60-year-old (both in good health) are paired in a footrace, chances are the 20-year-old will win—the 60-year-old is experiencing the aging process. By age 60 a predictable biological decline has set in that will continue to limit physical capacity. Gray hair, wrinkled skin, blurred vision, impaired hearing, decreased lung capacity and inhibited joint mobility are among the characteristics of this decline.

Modern medicine has left this biological aging process intact. In developed countries, infectious diseases that killed children in the past now are prevented and treated. Consequently, more people are living through youth and reaching what appears to be a fixed, upper age limit.

Thus life expectancy—the average age individuals attain before death—has increased. But the human lifespan—the maximum number of years any person can reach—has remained virtually unchanged since recorded history. Medical achievements have simply allowed more people to approach the "immutable limit." As death in the early years becomes increasingly less frequent in the developed countries, life expectancy curves, which reflect the percent of people living to specific ages, are becoming rectangular, as indicated by the arrow in Figure 4, page 10.

If all causes of death reported on death certificates (diseases and accidents) were totally eliminated, life expectancy curves would reach a nearly rectangular shape. Citizens would live out their lives free of the fear of premature death, but with the knowledge that their normal physiological decline would bring about death on approximately their 100th birthday.

Diseases of old age are superimposed on the normal physiological decline that accompanies biological aging. Because the physiological decline of old age increases an individual's vulnerability to disease, the fundamental causes of death are not diseases, but the physiological decline itself.

Biomedical research, however, has focused almost exclusively on the disease-associated causes of death. Scant attention has been paid to the underlying causes of aging that are not disease-associated, but which, in clocklike fashion, dictate a specific maximum lifespan for each species.

Strategies for Increasing Lifespan

Biomedical research can extend human life over the next 25 years in two ways. The first is to reduce or eliminate the major causes of death that now appear on death certificates. For most developed countries, this would mean eliminating heart disease and cancer. Successfully conquering these two major killers would add approximately 14 years to life expectancy in the U.S. In developing countries (and in some areas of developed countries) life expectancy at birth can be extended by simply motivating the political and economic systems to provide citizens with the necessary food, sanitary facilities, and medical care that are commonplace in most developed countries.

The second way biomedical research can extend human life is by addressing the underlying non-disease related causes of aging. These physiological losses are the basic biological changes that result in the physical decline of aging. Such an approach affects the quality of life and represents an attempt to extend what appears to be a fixed lifespan.

As a measure of the current effort toward these two approaches, funds spent in the United States on heart disease, stroke and cancer research are about 20 times greater than the funds spent on the causes of aging. In both these areas the number of researchers, and

consequently the amount of effort, probably differs twenty-fold as well.

If the potential success of either of these endeavors can be measured by the current attitudes and priorities of the U.S. biomedical research establishment, then the search for heart disease and cancer cures are much more likely to affect human longevity than gerontology research. Eliminating these two diseases can add a fixed number of years to life expectancy, but with successful efforts to increase lifespan, no fixed end point is ruled out. Cures for heart disease and cancer will not reverse or halt the physiological decline of aging, whereas efforts to increase life span could.

Research on heart disease and cancer should not be stopped; but if the goal is to maximize both the quality and length of human life, then current priorities are seriously out of balance, contends Leonard Hayflick.

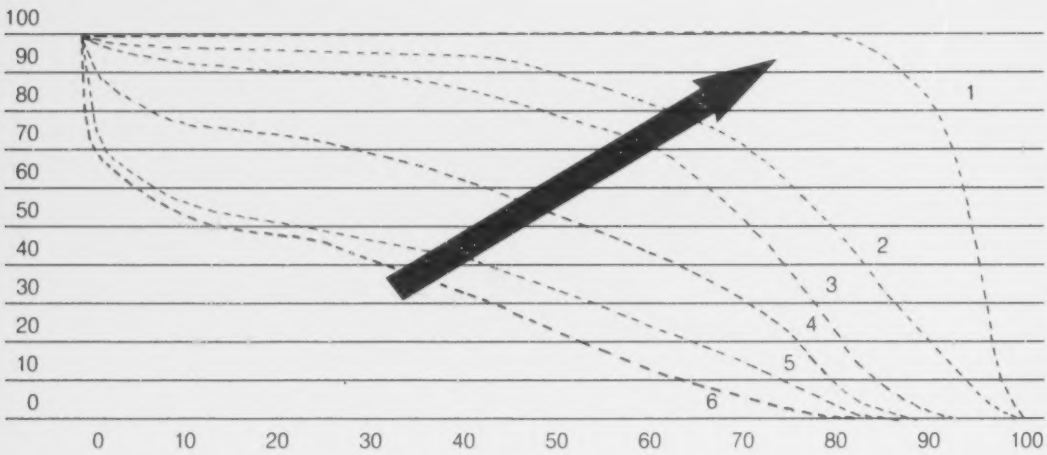
Ethical Considerations

Better hygiene, health care, and nutrition will improve life expectancy substantially for the poorest people now denied basic human needs. No new scientific understanding of aging is required, only motivation and money. Meeting the basic needs of the world's poorest people would increase worldwide life expectancy, but would not affect the lifespan or the rate of aging.

For significant increases in both the length and the quality of life to take place, spectacular scientific achievement will be necessary. To extend life expectancy much beyond the 14

Figure 4
Life expectancy curves for various time periods

1 Ultimate curve
2 U.S. total population, 1980
3 U.S. whites, 1939-41
4 U.S. whites 1900-02
5 Mexico, 1930
6 British India, 1921-30



Source: ref. 3

years eliminating heart disease and cancer would add, an understanding of the biology of aging and the ability to slow down the process would be needed.

The likelihood that either of these events will occur in the then next 25 to 50 years is doubtful in Hayflick's judgment. But if these achievements are made, U.S. social, political, and economic institutions are likely to be severely dislocated. The success in increasing life expectancy from 50 years in 1900 to about 74 today has not been accompanied by greater respect and care for the elderly, says Hayflick. If social support systems for 22 million elderly can not be managed in 1984, he asks, what is the likelihood that more can be done for 28 million elderly in 1990 or 40 million elderly in 2025?

Charles Nam agrees and argues that improving the quality of life is a more humane goal than extending the life of people who have already begun a significant physiological deterioration.

Until better solutions for control of chronic diseases are found and the quality of life for the aged enhanced, the costs of building sophisticated life-support systems and the ethics of pulling the plugs will be even more agonizing in 2025. A new ethical system regarding heroic measures to prolong nonproductive or vegetable life must emerge. Under these circumstances, death is postponed, but aging is not.

Biomedical successes have virtually eliminated deaths in the early years and have permitted more people to grow old. Rather than celebrate this triumph the public has regarded the increasing numbers of older people as a burden. The prevailing negative attitude toward the burgeoning number of older people is tantamount to lamenting the number of baby-boom young people as an equivalent burden that society must endure, says Hayflick. The task of government and other U.S. institutions is to make adjustments and plans that will allow society to cope with all demographic changes positively and humanely.

Counting the Federal Costs of Increased Life Expectancy

Today the federal government is spending 27 percent of its yearly budget (an estimated $218 billion) on people 65 and older. This proportion could grow to an estimated 50 percent of the federal budget by 2025.[4]

Since 1970, life expectancy at age 65 has increased by approximately one and a half years. If this increase had not occurred, present federal outlays would be $9 billion less than they are today. If life expectancy for people 65 and over had increased one year more, however, 1983 federal budget outlays would have increased another $6 billion.

Table 1 shows the full 1983 costs the federal government would have borne if certain causes of death had been eliminated and the aged today had experienced the resulting increase in life expectancy. These increased costs reflect only the percentage increase in life expectancy times the average amount of 1983 outlays spent on the aged. The medical treatment costs saved by the elimination of the disease are not subtracted. Therefore, the figures may overstate the federal burden. Nevertheless, the potential cost increases are too large to be ignored and suggest more attention needs to be focused on future mortality rate changes.

Table 1

Potential increases in 1983 federal costs if certain causes of death were eliminated

Cause of death	Percent increase in life expectancy at age 65	Full federal costs in billions of 1983 dollars
Heart disease	30.9%	$67.4
Cancer	8.5	18.5
Stroke	7.3	15.9
Motor vehicle and other accidents	1.2	2.9

Source: ref. 4

A Simulation: Eliminating Premature Death in 1978

To illustrate the effect of "premature" death on the federal budget, Barbara Torrey and Douglas Norwood calculated what would have happened if those who died in one year had survived to their life expectancies. They examined the three major causes of death (heart disease, cancer, and motor vehicle accidents and homicides) in the year 1978. The total potential taxes the individuals would have paid if they had not died were compared to the total retirement and medical benefits they would have received if they had lived to their 1978 life expectancy.

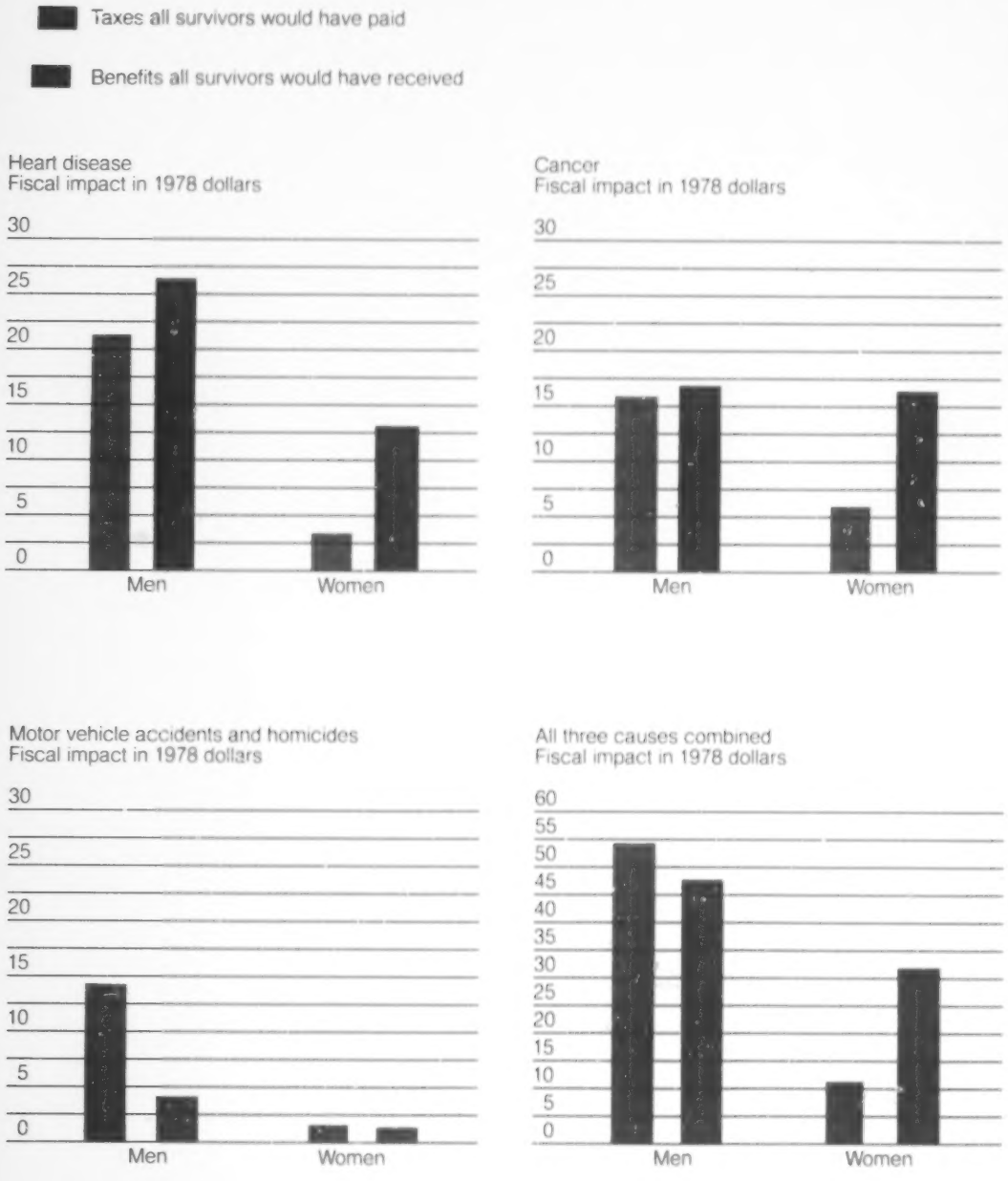
The estimates were based on a number of simplifying assumptions: State, local and federal taxes are estimated based on the individual's age; benefits are defined as federal programs for the aged and federal and state medical costs; the "resurrected" individuals are assumed to work at average wages for each age group and then retire at age 65; and, the individuals are assumed to avoid premature death from another cause and enjoy the average 1978 life expectancy at age 65.

Any of these assumptions could be made more sophisticated, and the results altered; but these simple assumptions allow the net fiscal effects of early death to be compared and they illustrate how much premature death affects the balance between federal taxes paid and benefits received.

Figure 5, page 13, shows that the total benefits that would have been paid to people had

Figure 5

The federal budget impact of eliminating three causes of early death in one year, by sex



Source: ref. 5

they not died prematurely in 1978 of heart disease, cancer, or car accidents and homicides would have *exceeded* the potential taxes they would have paid by $15 billion. Women received more than they paid, men slightly less.

This is partly because women spend less time in the labor force and live longer than men.

Heart disease accounts for half of all deaths in the U.S. An estimated $24.9 billion in future taxes was lost because of premature deaths from heart disease in 1978. Had the victims lived to their life expectancy, however, they would have claimed $40 billion in benefits for the aged. Therefore, if mortality from heart disease before age 65 is reduced significantly, the demand for benefits for the aged, especially from males who are its major victims, will increase, producing a drain on public treasuries.

Cancer, on the other hand, affects both sexes about equally. Since women earn lower average wages, they pay less in taxes. And, because women live longer than men, women collect more benefits from programs for the elderly. Therefore, if premature deaths from cancer were eliminated, the net fiscal effect would be a substantial loss for women but almost none for men.

The major victims of car accidents and homicides are young men at the beginning of their productive lives. The elimination of these deaths would produce a substantial fiscal gain because future taxes lost from these deaths are greater than potential benefits saved.

For all three cases examined, the federal benefits the individuals would have received had they lived out their life expectancy would have been greater than the taxes they would have paid had they survived. On the other hand, the economy would be larger if the victim's private production and consumption had not been lost. Ultimately, the interaction of these budgetary and economic variables determines the full implications of changes in mortality.

Federal Retirement Plans

Improvements in the death rate can be important in projecting future federal outlays. Estimates of federal outlays for the aged for 2030 would be 40 percent understated if we assume death rates do not improve, but improvements, in fact, continue at the historic rate.

Yet, as of 1981, Civil Service was the only federal employee retirement program that explicitly assumed mortality rates would improve in the future. Mortality rates from a 1977 evaluation were reduced 10 percent in anticipation of future mortality improvements and used as the basis of assumptions made. A 10 percent improvement, however, is only half the improvement that *actually* occurred between 1970 and 1982 for ages 55 to 85 alone. Still, their assumption of some improvement contrasts with most of the other federal retirement plans, which assumed no improvement at all, and in fact used mortality rates based on actuarial tables constructed at least 12 years ago.

Programs for aged veterans also will be affected by increases in life expectancy. Today all veterans 65 and over are defined as disabled and therefore are eligible for full medical benefits. The number of aged veterans and their surviving spouses eligible for benefits is expected to increase from 5 million in 1980 to 15 million by 2000. A one-year increase in life expectancy would increase the number of beneficiaries in 2000 by another one million and increase federal costs correspondingly. The Veteran's Administration will have to redefine the criteria for disability if it is not to bear the full costs of increasing life expectancy.

The Public Costs of Women Surviving Men

Discussing the impact of increased life expectancy on federal programs obscures the more specific issues raised by the unequal increases in life expectancy between sexes. Even though both male and female life expectancy rates will improve, Social Security Administration actuaries assume that the gap in life expectancy between men and women will continue to increase.

Fifty-two percent of all aged women are widowed today. The average length of widowhood is approximately 15 years.

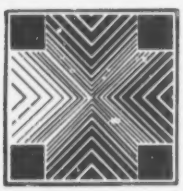
The death of a spouse is not only emotionally traumatic, but widowhood appears to leave the surviving women more vulnerable to poverty. Sixty-five percent of all aged widows would be poor without government programs; 20 percent remain poor even after those transfers. In comparison only 7 percent of aged women who are still married are living below the poverty line. One reason for the difference may be that widows are usually older than aged married women; another may be that they lose the earning power and retirement income of men.

The poverty of widows puts persistent pressure on programs for the elderly. Social services that help support these women in the community will be strained as their number increases.

Women who are 65 and over have fewer days of short-term hospital care than men, but they outnumber aged men almost three to one in nursing homes. In many cases the nursing home becomes the only alternative for an aged person living alone who becomes ill or infirm. An increasing gap in life expectancy between sexes will further increase the need for nursing homes for surviving spouses. Conversely, a decrease in the gap is likely to decrease both the need for nursing homes and the need for support services for a widow or widower who is not yet in a nursing home.

The fiscal impact, however, is ultimately less important than the question of equity. Women today have a life expectancy at birth that is 7½ years longer than that of men. At age 65 the difference is more than 4 years. Largely because women outlive men and spend less time as wage earners, the ratio of benefits to contributions in Social Security for females is nearly twice the ratio for men.

The difference in life expectancy is not just an abstract inequity that results in lower rates of return from Social Security contributions for men. Some actuaries would adjust their formulas to provide men the same rates of return on their contributions as women receive. But this does not solve the whole problem. An alternative, from the standpoint of equity, is to focus biomedical research efforts on reducing mortality rates from causes that disproportionately affect men. This would give men longer lives and a better return on their Social Security contributions. It would also provide more companions for aged women, which is (or should be) a major societal concern.



In Conclusion

Death and taxes are popularly viewed as humanly inescapable and, implicitly, complements of one another. They might better be viewed as alternatives: The postponement of death increases federal costs, requiring more taxes.

If we anticipate the timing and magnitude of these cost increases, we can meet them or adjust programs to minimize the economic burden. But if the political system ignores the potential costs stemming from improving survival rates, the process of adjustment will be more difficult, and almost certainly more costly.

Thomas Mann once insisted that "a man's death is more his survivors' affair than his own." Increasingly, however, the postponement of an individual's death is becoming a federal affair, and one whose implications we cannot ignore.

Footnotes

1. Keyfitz, Nathan, "Improving Life Expectancy: An Uphill Road," *American Journal of Public Health*, 1978, Vol. 68, pgs. 954-956.
2. Tsai, Shan Pou, Eun Sul Lee, and Robert J. Hardy, "The Effects of a Reduction in Leading Causes of Death: Potential Gains in Life Expectancy," *American Journal of Public Health*, 1978, Vol. 68, pages 966-971.
3. Myers, George C., "Future Age Projections and Society," *Aging: A Challenge to Science and Social Policy, Vol. II*, (Oxford: Oxford University Press, 1981).
4. Torrey, Barbara Boyle, "Guns vs. Canes: The Fiscal Implications of an Aging Population," *American Economic Review, Papers and Proceedings*, May 1982.

References

1. Social Security Administration, Office of the Actuary, "Social Security Area Projections, 1974, 1977 and 1981," Actuarial Studies 72, 76, and 85.
2. U.S. Bureau of the Census, 1982, "Projections of the Population of the United States: 1982 to 2050," Series P-25, No. 922.
3. Adapted from A. Comfort, *The Biology of Senescence*, 3rd. ed. (New York: Elsevier, North-Holland, 1976).
4. Based on estimates of gains in life expectancy published in National Center for Health Statistics, U.S. Public Health Service, "U.S. Life Tables by Cause of Death: 1969-1971," by T.N.E. Greville, *U.S. Decennial Life Tables for 1969-1971*, Vol. 1, no. 5, 1976.
5. Based on the death rates by age groups and sex published in *Health, United States*, 1981, U.S. Department of Health and Human Services, Public Health Service, (PHS) 82-1232, Dec. 1981.

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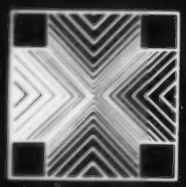

The Graying of the Sunbelt:

A Look at the Impact of U.S. Elderly Migration

By Jeanne C. Biggar

The Graying of the Sunbelt: A Look at the Impact of U.S. Elderly Migration is the sixth in a series of occasional papers, *Population Trends and Public Policy*, published by the Population Reference Bureau, Inc. This series is devoted to a discussion of demographic issues of concern to policymakers.

Jeanne C. Biggar is an Associate Professor of Sociology at the University of Virginia, Charlottesville, Virginia. Her report is part of the larger research project "Retirement Migration Project—Phase II," supported by the National Institute on Aging. The author wishes to thank Charles F. Longino, Jr., Principal Investigator, University of Miami; Cynthia B. Flynn, Co-Investigator, Social Impact Research, Seattle; Robert F. Wiseman, Co-Investigator, University of Kansas; and Donna Jost Tolson, Research Assistant, University of Virginia, for their comments on earlier drafts.

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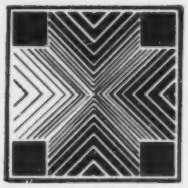


The Graying of the Sunbelt

In Summary

Demographic Trends

- The number of Americans age 60 and over moving to the Sunbelt each year has nearly doubled since 1950. This flow of migrants will continue if not increase during the next decade.
- Florida remains the major destination of U.S. retirees, drawing one-quarter of all the nation's elderly migrants.
- California is second only to Florida in the number of elderly settlers it receives, but its attraction seems to be weakening while Arizona's is growing rapidly. Arizona may soon move ahead of California as the major destination of retirees in the Southwest.
- North Carolina rose from the 17th to the 7th most popular destination for U.S. elderly between 1970 and 1980. Recent increases in the numbers of elderly settling in New Mexico and South Carolina suggest that these states may become important centers of elderly migration in the next decade.
- A significant number of elderly are leaving Florida and California for states outside the Sunbelt. Because these two states were major centers of retirement 20 years ago, these migrants are assumed to be returning to their homestates to be near relatives when a spouse dies, or when they become ill or they encounter financial difficulties. Some of California's outmigrants may be returning to their birthstate once they are free of job ties.
- The majority of Sunbelt migrants are in their early retirement years, well-educated, financially secure, and they are usually accompanied by a spouse. However, those leaving the Sunbelt are more likely to have incomes below the poverty line, be disabled or living in institutions or homes for the aged.
- Arizona and Florida are receiving the wealthiest and most independent of all elderly migrants. The groups of migrants settling in California and Texas include the largest number of needy and dependent elderly.

Policy Implications

- All Sunbelt states will have to cope with larger numbers of older citizens. Increased demand for housing will press the capacity of local utilities. The elderly's vulnerability to crime will bring added demand for police and fire department protection.
- The newcomers bring with them the more fiscally conservative orientation typical of their generation. Their impact on local and state politics is yet to be discerned, but support for public school programs may shift in favor of services for the aged.
- For Arizona and Florida, receiving the wealthiest, most independent migrants, the "graying of the Sunbelt" brings increased demand for retail goods and for housing for retired couples, as well as for recreational, health and protective services.
- For California, receiving the greatest number of poorer migrants, elderly migration will place additional pressure on government welfare services and local agencies for the aged.
- Some northeastern states may experience both a shrinking tax base and a greater demand for local services for the aged as they lose their younger, more independent elderly to the Sunbelt and receive older, more dependent elderly in return.
- States receive federal dollars for senior citizens' programs based on the number of elderly residents in the state, not on the income level of those residents. Unless the federal payment formula is altered to favor states with the neediest elderly residents, migration will strain the resources of many northeastern states and of Sunbelt states receiving the poorest elderly.

/ENTURE IN MOVING

Recent Elderly Migration Patterns

The Sunbelt, extending from Virginia south to Florida and west to California, became home to more than half of all the older persons who migrated between 1975 and 1980. Nearly one million people 60 years old and older—500 per day—moved to one of these states.

Just 20 years ago, only half as many elderly moved South. Small retirement communities in Arizona, Florida, California and Texas provided havens for the affluent elderly escaping northern winters during the 1950s and 1960s. Today those earlier "snowbird" patterns have been replaced by large flows of elderly migrants settling permanently in the Sunbelt states.

The impact of the Sunbelt's influx of elderly residents is being felt socially, economically and politically in both the Sunbelt states and the northern states left behind. An examination of recent data reveals that the Sunbelt is gaining at the North's expense; and, while the newcomers are enriching the economies of Florida and Arizona, they are burdening the resources of California.

On the Road Again: An Overview of Current Trends

The first half of this report focuses on internal migration within the United States. The impact of international migration from outside the U.S. is examined on a state by state basis beginning on page 9. In order to reflect those individuals who retire early, this report defines "elderly" as age 60 years old and older.

Generally, retirees are less mobile than younger people in the work force. Less than five percent of the U.S. elderly population ventured to make an out-of-state move between 1975 and 1980, compared with ten percent of the total U.S. population.

More than 17 percent of the total U.S. population are age 60 or older; but overall, only eight out of every 100 U.S. migrants were elderly (see Table 1, page 4).

Only about one-third of the U.S. population makes their home in the 12 Sunbelt states: Alabama, Arizona, California, Florida, Georgia, Louisiana, Mississippi, New Mexico, North Carolina, South Carolina, Virginia and Texas. These 12 states, however, drew more than half of the nation's elderly migrants.

Five Sunbelt states ranked among the ten most popular destinations. Florida, California, Arizona, and Texas ranked first through fourth, respectively. North Carolina ranked seventh. Florida alone welcomed more than one-fourth of the entire nation's elderly migrants.

But the Sunbelt states also attracted more than two-fifths (43 percent) of all U.S. migrants. Does the Sunbelt's elderly flow simply reflect general migration in that direction?

This is true in some Sunbelt states but not in others. In Florida, the elderly comprised nearly one-fourth of the state's inmigrant flow, three times the national average. Arizona exceeded and New Mexico equalled the national average of eight elderly out of every 100 migrants.

California did not. California drew the nation's largest group of general migrants and the second largest group of elderly migrants, but less than eight percent of its total migrants were over 60.

Due primarily to the numbers of elderly flocking to Florida and Arizona, however, the Sunbelt as a whole registered a larger share of elderly migrants than the nation as a whole. These differences suggest that certain regions within the Sunbelt hold different attractions for elderly migrants. The East Coast states directly north of Florida have become increasingly popular, particularly North Carolina, which jumped from the 27th to the 7th most popular destination for elderly movers between 1960 and 1980. These states now provide additional retirement options for persons who otherwise might have gone to Florida.

The Gulf states between Florida and Texas continue to attract elderly migrants, but they show little potential of rivaling the current major destination states within the Sunbelt. Texas, New Mexico and Arizona all attracted increasing numbers of elderly migrants during the past two decades, with Arizona's portion edging closer to California's declining portion.

Going South: Elderly Migration To the Sunbelt

Although all Sunbelt states received sizable numbers of elderly migrants between 1975 and 1980, only North Carolina, Florida, Texas, Arizona and California received major "streams"[1] from states outside the Sunbelt with which they share no common borders (see Figure 1). For example, Florida, the leading destination for elderly migrants nationwide, drew streams from Connecticut, Indiana, Massachusetts, Michigan, New Jersey, New York, Ohio and Pennsylvania.

These inmigration patterns showed some interesting changes between 1970 and 1980. The range of origin states widened when Pennsylvania joined the seven northeastern and midwestern states sending streams of elderly to Florida. New streams to Arizona originated in Iowa, Minnesota, Washington and Wisconsin. Also, Maryland and New Jersey began sending substantial numbers of migrants to North Carolina and elderly Kansans began settling in Texas.

In contrast, two streams received by California appear to have been "rerouted" to other Sunbelt states. Minnesota sent a stream to California in 1970 and by 1980 a new Minnesota-to-Arizona stream replaced it. Missouri also sent a stream to California in 1970 and by 1980 a new Missouri-to-Texas stream replaced it.

These recent migration patterns signal changes that will continue to be felt in the decade ahead. In the East, Florida maintained its position as the primary destination for East Coast elderly movers. North Carolina emerged

Table 1

Elderly migration to the Sunbelt from other U.S. states, 1975-1980

Sunbelt state	Number of interstate migrants received		Percent of interstate migrants received				Percent of state's inmigrants 60+ years
	total	ages 60+	total	(rank)	60+	(rank)	
Alabama	319,954	20,300	1.57	(25)	1.23	(27)	6.34
Arizona	598,368	93,709	2.94	(8)	5.66	(3)	15.66
California	1,877,289	145,018	9.22	(1)	8.77	(2)	7.72
Florida	1,801,362	428,559	8.85	(2)	25.9	(1)	23.79
Georgia	581,553	25,985	2.86	(9)	1.57	(14)	4.47
Louisiana	324,666	13,121	3.64	(24)	0.79	(35)	4.04
Mississippi	213,197	14,658	1.05	(33)	0.89	(31)	6.88
New Mexico	206,948	17,069	1.02	(34)	1.03	(30)	8.28
North Carolina	538,400	37,572	2.65	(14)	2.27	(7)	6.98
South Carolina	331,687	20,172	1.63	(23)	1.22	(25)	6.08
Texas	1,436,237	74,931	7.06	(3)	4.53	(4)	5.22
Virginia	694,880	33,727	3.41	(4)	2.04	(11)	4.85
Sunbelt migrants	9,249,207	924,821	43.45		55.91		10.36
U.S. migrants	20,358,454	1,654,261					8.13

Source: ref. 1

as a second major destination in the eastern Sunbelt. Since Florida's inmigration continued at record highs during the past decade, it seems more likely that North Carolina attracted a new group of migrants rather than diverted part of Florida's flow. South Carolina's recent increase in elderly migrants suggests that it may become an important center in the next decade.

In the central Sunbelt, Texas also emerged as a major destination for elderly settlers from outside the Sunbelt. Migration patterns to the western Sunbelt appear to be undergoing a major shift. In the 1960s, California was the Southwest's major destination for elderly migrants, with Arizona a distant second. By 1980, however, Arizona's major streams outnumbered California's streams and two of California's streams had been diverted to other Sunbelt states. Arizona now appears to be one of the fastest growing Sunbelt destinations for elderly migrants, threatening to overtake California's position during the next decade.

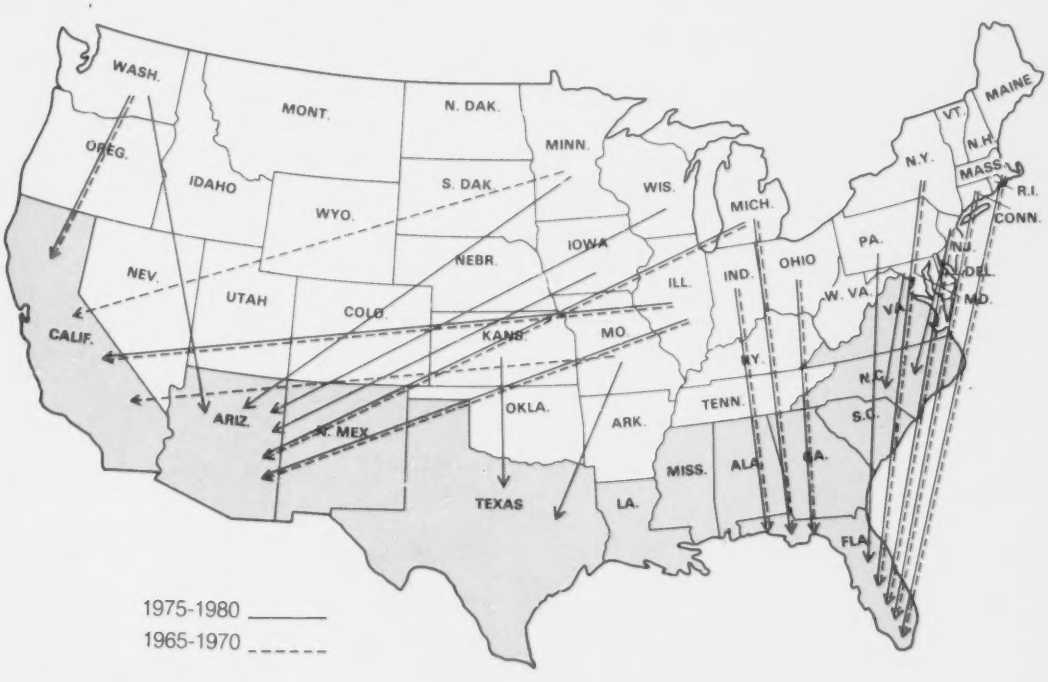
New Mexico, while still ranking low in national volume, bears watching during the 1980s. The recent near doubling of its elderly migrant flow suggests that its retirement communities will lure increasing numbers of retirees in the future.

Going Home: Elderly Migrants Leaving the Sunbelt

Both Florida and California sent significant numbers of elderly migrants to states *outside* the Sunbelt (see Figure 2, page 7). Major streams of elderly migrants left Florida for Michigan, New York, Ohio and Pennsylvania. The destinations of the streams of elderly leaving

Figure 1

Elderly migration to Sunbelt states from non-Sunbelt states that share no common borders.



Source: ref. 1

California were Arkansas, Colorado, Idaho, Missouri, Oklahoma, Utah and Washington.

The patterns to and from Florida were quite different from those to and from California. Streams from Florida all end in states that send migrants to Florida. Thus Florida's outmigration is most likely "return migration," consisting of persons who moved to Florida in their early retirement years and are returning to their state of birth to be near family after a spouse dies or with the onset of health or financial problems.[2]

Except for Washington and Missouri, no state receiving elderly migrants from California sent sizable streams to California. This migration pattern could be explained in several ways. First, long-term California residents who reach retirement age may establish a retirement residence elsewhere. California's destination states include the Ozark regions of northern Arkansas and southern Missouri, well-known retirement centers.

A second possible explanation for California's pattern could be a different kind of return migration. California, the state of golden opportunity during the first half of the 20th century, was a primary destination for interstate migrants of all ages. Persons who moved to California in early adulthood may return to their state of origin once they are free from job ties. Indeed, some may return to their state of birth to help care for their own aged parents.

Both California and Florida expanded their outmigration streams to include six more destinations by 1980. Streams to Michigan and Pennsylvania were added to Florida's two existing streams to New York and Ohio. (Florida's 1970 outmigration stream to Massachusetts now has disappeared.) By 1980, California added outmigration streams to Arkansas, Colorado, Idaho, and Missouri, to its 1970 streams to Oklahoma, Utah and Washington.

Regional Shuffle: Migration Within the Sunbelt

Although moves from northern states to the Sunbelt have been most pronounced, there is also considerable movement among Sunbelt states (see Figure 3). Virtually every Sunbelt state saw elderly move into and out of neighboring states in the 1960s and 1970s. One notable exception was Florida.

Since 1955, elderly Floridians have moved to Alabama, Georgia, and more recently to North Carolina, but *no* Sunbelt state has sent a major stream into Florida in the past 20 years. Florida's climate is similar to the Gulf states and persons living in Georgia or North Carolina may not desire a warmer climate. Elderly Floridians, however, may seek lower living costs, less crowding, or the more evident change of seasons in the states directly north of Florida.

Both in the 1960s and the 1970s, the greatest number of intra-Sunbelt streams emptied into Texas. Elderly migrants moved there not only from neighboring Louisiana and New Mexico, but also from Arizona and California. In 1970, Texas returned migrants only to New Mexico; but by 1980, elderly Texans were moving to Louisiana and California as well. Intra-Sunbelt migration is a major reason Texas ranks fourth nationwide in the number of elderly migrants it attracts.

Figure 2

Elderly "return" migration.

Figure 3

Elderly migration between Sunbelt states.

Source: ref. 1

Who Are These Elderly Migrants?

We have seen that the Sunbelt states gained more migrants than they lost. Using recent census data we can also determine what kinds of older persons moved in both directions (see Table 2).

A comparison of migrants to the Sunbelt with migrants from the Sunbelt yields surprising results. Between 1975 and 1980, the Sunbelt states gained wealthier and more independent elderly, and they lost lower-income, more dependent elderly.

The elderly migrants moving into the Sunbelt were younger, on the average, than those moving out of the Sunbelt and fewer were 75 years or older. They were predominantly white and more were married. Very few elderly persons moving to the Sunbelt were returning to their state of birth.

More Sunbelt migrants were living independently and fewer were living alone, or with a relative or in an institution. They were more highly educated and were less likely to be in the labor force or receiving welfare than their non-Sunbelt counterparts.

Inmigrants' average income exceeded that of the outmigrants on most income measures. Sunbelt migrants were more highly represented in upper-income brackets and more sparsely represented in poverty levels than were non-Sunbelt migrants.

While the Sunbelt as a whole attracted the younger, more independent elderly, there were important differences in the composition of the groups of migrants each major Sunbelt state received. An examination of the demographic characteristics of all of each state's new arrivals (migrants from other states and abroad) sheds light on the impact of their movement.

Arizona

Arizona drew the region's youngest migrants (see Table 3, page 10). They had the lowest average age, the lowest proportion over age 75 and almost all were white. Less than one per-

Table 2

Comparison of migrants into the Sunbelt with migrants into the non-Sunbelt, 1975-1980

Migrant characteristics	To Sunbelt	To non-Sunbelt
Size of sample used	18,598	5,709
Demographic		
Mean age	68.7	70.5*
% Age 75+	18.7	29.0*
% Male	45.8	40.5*
% White	95.1	93.1*
% Black	3.8	5.3*
% Cannot speak English well	2.2	1.2†
% Spanish origin	2.5	2.0†
% Married	68.7	51.3*
% Widowed	22.2	34.8*
% Returning to state of birth	6.0	31.0*
% Disabled	11.3	17.9*
Living arrangements		
% Living alone	15.7	22.3*
% Living independently	84.7	73.0*
% Living w/child	8.0	12.7*
% Living w/sibling	1.8	2.9*
% Living in institution	2.8	7.0*
% Living in home for aged	2.1	5.4*
Socioeconomic status		
Mean years of schooling	11.5	10.8*
% w/1+ years of college	28.7	24.1*
% in the labor force	13.4	14.8†
% on welfare	5.0	7.3*
Mean job income	10,705	9,872†
Mean business income	9,709	6,591†
Mean investment income	4,977	3,932*
Mean social security income	3,495	3,223*
Mean welfare income	2,279	1,958†
Mean pension and other income	5,760	4,914*
Mean total personal income	9,984	8,016*
Mean total household income	18,734	17,106*
% 200% + poverty level	71.9	60.4*
% below poverty level	7.7	12.1*

*Difference statistically significant at .001.
†Difference statistically significant at .05.

Source: ref. 2

cent were black and few were of Spanish origin.

Almost three-fourths of Arizona's elderly migrants were married and less than one-fifth were widowed. This state received both the fewest migrants returning to their state of birth and the fewest disabled migrants of any Sunbelt state.

Arizona's newcomers were also the most independent of all the groups of elderly movers; nearly nine in ten lived in independent households, and most lived with their spouse. These migrants had the highest education levels and their income averages were the highest (or next highest to Florida migrants) on all eight income measures. They represented the lowest percentage receiving welfare or living below the poverty line.

The fact that Arizona attracted migrants of similar if not higher income ranks than Florida is somewhat surprising. Arizona's migrants are primarily from the Midwest; Florida's migrants come from the Northeast where income levels and the cost-of-living tends to be the highest in the country. This suggests that Arizona draws the Midwest's most affluent elderly.

This influx of "young" and well-to-do elderly had a major impact on Arizona's older population. Arizona's approximately 96,000 new elderly residents reduced the average age, and increased the proportion of the state's married and white populations. They also reduced the disability rate among older residents (see Table 4, page 13). These migrants reduced the share of older people living alone.

Their educational level increased the average years of schooling completed by Arizona elderly. More of Arizona's inmigrants were fully retired, so they lowered the percentage of elderly in the labor force. They also brought higher social security and total household income, raising the average Arizona income in those categories. Migrants added to the high-income segment of the population and reduced the low-income segment.

Their impact on the housing market was significant. The majority of elderly migrants moved into new homes with complete plumbing and central air conditioning. Along with Florida, Arizona attracted the youngest elderly migrants who were wealthier and more independent than those received by other Sunbelt states.

California

In sharp contrast to Arizona, California's inmigrants were at the bottom of all independence ranks. They were older and more dependent than the elderly received by the other four leading Sunbelt destinations (see Table 3, page 10). Just over half of California's elderly migrants were married and nearly a third were widowed. About one in eight were disabled in some way.

Only about two-thirds—the lowest of any elderly migrant flow to the Sunbelt—were living in independent households. This was partially due to the large number of elderly migrants living with a child. Compared with Arizona or Florida migrants, nearly twice as many Califor-

Table 3

Comparison of the characteristics of all migrants received by the five major Sunbelt destinations, 1975 to 1980*

Migrant characteristics	Arizona	California	Florida	North Carolina	Texas
Demographic					
Mean age	68.1	69.7afn	68.3	69.1af	69.6af
% Age 75+	15.9	24.3afn	16.3	20.5af	25.8afn
% Male	47.3	40.3	47.6cnt	44.1c	41.4
% White	97.4cnt	77.5	97.5cnt	87.2c	90.5cn
% Black	0.5	4.0af	1.5a	11.6acft	3.5af
% Cannot speak English well	1.5	18.0afnt	4.4an	1.1	8.5afn
% Spanish origin	1.9	8.1afn	5.5an	1.1	8.9afn
% Married	73.4cnt	53.3	74.2cnt	60.0ct	56.2
% Widowed	18.3	33.1afn	18.2	29.0af	32.5af
% Returning to state of birth	1.2	3.0af	1.1	29.6acft	21.1acf
% Disabled	8.6	15.2afn	9.4	13.0af	16.0afn
% From abroad	2.0	27.0afnt	5.1an	2.1	8.9afn
Living arrangements					
% Living alone	13.7	18.2af	13.9	18.9af	18.0af
% Living independently	87.6cnt	65.1	88.3cnt	79.0ct	72.0c
% Living w/ child	7.3f	22.3afnt	6.0	10.0af	15.9afn
% Living w/ sibling	1.4	2.2aft	1.6	2.5af	1.5
% Living in institution	1.7	5.6af	1.4	4.8af	6.7afn
% Living in home for aged	1.2	3.8af	1.1	3.6af	5.7acfn
Socioeconomic status					
Mean years of schooling	12.0cfnt	10.6	11.5cnt	11.1ct	10.7
% w/ 1+ years of college	34.6cft	27.8	27.4	32.0cft	27.5
% in the labor force	12.7	18.5afn	11.4	14.6f	19.3afn
% on welfare	2.6	14.4afnt	4.1a	7.2af	7.2af
Mean job income	2,032.0	2,086.0f	1,821.0	1,904.0	2,746.0acfn
Mean business income	376.0c	164.0	267.0c	216.0	304.0c
Mean investment income	2,486.0cnt	1,667.0	2,647.0cnt	1,637.0	1,659.0
Mean social security income	2,426.0cnt	1,840.0	2,569.0acnt	2,269.0ct	2,028.0c
Mean welfare income	63.0	347.0afnt	94.0	115.0a	132.0a
Mean pension and other income	1,934.0ct	1,264.0	1,902.0ct	2,104.0ct	1,462.0
Mean total personal income	9,366.0cnt	7,333.0	9,256.0cnt	8,343.0c	8,298.0c
Mean total household income	18,084.0nt	16,058.0afnt	17,681.0	16,992.0	18,001.0
% 200%+ poverty level	69.7cnt	62.6	71.4cnt	64.2t	60.7
% below poverty level	7.5	9.9af	7.7	10.9af	10.3af

a—This state's mean is higher than Arizona.
c—This state's mean is higher than California.
f—This state's mean is higher than Florida.
n—This state's mean is higher than North Carolina.
t—This state's mean is higher than Texas.

*Includes migrants from all U.S. states and abroad.

Source: ref. 3

nia migrants moved into institutions or homes for the aged.

Many of California's migrants were still in the labor force. Nearly one-eighth of the migrants—more than double the proportion of any other Sunbelt state—received welfare, defined here as federal Supplemental Security Income programs. Finally, these migrants registered the lowest on several income measures including social security, pension, and total personal income.

Eighteen percent of California migrants said they did not speak English well. Many of these migrants claimed Spanish origin, indicating that they were Mexican-Americans coming to live with sons or daughters working there.

Migration brought nearly 200,000 new elderly residents to California between 1975 and 1980, with more than one in four coming from outside the United States. Among those migrants from abroad, one-fifth were born in the Philippines, one-tenth in China and one-tenth in Mexico. It should be noted that compared with Arizona, California received more than 13 times as many new elderly residents from abroad. If movers from abroad were excluded, the averages for California would be raised and the apparent differences between California and Arizona reduced.

Absorbing this group of new elderly residents significantly changed California's demographic profile. The new arrivals represented the lowest percentage of white migrants received by the five major Sunbelt destinations, but they increased the white component of the state's elderly population (see Table 4, page 13). The new elderly also increased the percentage who did not speak English well.

The elderly migrants reduced the independence levels of the state's elderly population. They lowered the average educational level, and also lowered all income measures except total household income. The increased household income average was due, no doubt, to the incomes of sons and daughters with whom almost one-fourth of these elderly migrants lived. The size of the public assistance checks received by California elderly migrants served to raise the state's average on welfare income.

California's migrants moved into newer dwelling units, more of which had central air conditioning than the homes of resident elderly. The elderly migrants lowered home ownership rates. Some of the impact on housing may be due to the sizable proportions of elderly migrants moving into institutions and homes for the aged. Most of these were built within the last 20 years and had central air conditioning installed at the time of construction.

Overall, California's migrants lowered both the residential and economic independence levels of the state's senior citizen population.

Florida

Elderly migrants to Florida were younger, more were married, and fewer were disabled or returning to their state of birth than migrants to

the other major Sunbelt destinations except Arizona. Florida migrants had household independence levels similar to Arizona's although fewer were living with a relative. Compared with Arizona, Florida received more than twice as many migrants from abroad. More than one in ten were Canadian born.

Florida migrants ranked second on average school years completed, but they had the lowest percentage of migrants with at least one year of college. Similar to Arizona migrants, Florida migrants' income levels were among the highest of all destinations.

Florida can be considered the prototype of the Sunbelt migration patterns. Not only did it attract the younger and more independent elderly, it also sent back the older and more dependent elderly, according to a recent study of migration streams between Florida and four northeastern states by Charles Longino of the University of Miami. The migrants who moved to Florida from New York, New Jersey, Pennsylvania and Ohio were younger, more were married, more were living independently, and had higher education and income levels than the migrants who left Florida for each of the northeastern states.[3]

The demographic impact of Florida's inmigration was similar to that of Arizona. Florida's influx of nearly 451,000 newcomers (including movers from abroad) reduced the average age but increased the state's percentage of senior citizens who were male, white, or married (see Table 4). It also reduced the disability level of the resident elderly population.

Although the percentage of elderly migrants living in independent households was not substantially larger than the percentage of local residents living independently, it was sufficient to reduce the segment living alone, in an institution or in a home for the aged.

These new Florida residents brought higher education levels, larger social security checks, and greater levels of personal and household income than the resident elderly. Overall, they increased the state's percent of elderly in the upper-income category and decreased the segment living below the poverty line. They also lowered the percentage of elderly in the labor force.

Finally, the migrants increased the share of elderly residents in new, high-quality homes with central air conditioning. Florida, then, along with Arizona, drew the youngest and most independent elderly migrants settling in the Sunbelt.

North Carolina

On most measures North Carolina's elderly inmigrants fell midway between those of the other major Sunbelt destination states (see Table 3, page 10). For example, North Carolina migrants were older than Arizona and Florida migrants but younger than California and Texas migrants. They also held the middle position for most measures of living arrangements and education levels.

There were several exceptions to this middle position, however. The largest percentage of

black migrants chose North Carolina as their destination. Also, the largest share of migrants returning to their state of birth were North Carolinians.

The new arrivals had the lowest average investment and total household income, and the next to lowest average job, business and total personal income. North Carolina received the largest percentage of elderly migrants below the poverty line of any of the five major destinations. Yet, the newcomers had the highest average income from pensions and other sources.

The influx had very little impact on North Carolina's population characteristics. For the most part, North Carolina attracted elderly inmigrants much like the elderly population already living there (see Table 4, below). The large

Table 4

The impact of migration on the characteristics of the resident elderly population in major destination states

Migrant characteristics	Arizona	California	Florida	North Carolina	Texas
Demographic					
Mean Age	-	0	-	0	0
% Age 75+	-	0	-	0	0
% Male	0	0	+	0	0
% White	+	+	+	+	0
% Black	-	0	-	-	-
% Cannot speak English well	-	+	0	0	+
% Spanish origin	-	0	0	0	0
% Married	+	-	+	0	-
% Widowed	-	+	-	0	0
% Disabled	-	0	-	0	0
Living arrangements					
% Living alone	-	-	-	0	-
% Living independently	-	-	0	0	-
% Living w/child	0	+	0	0	+
% Living w/sibling	0	+	-	0	0
% Living in institution	0	+	-	0	0
% Living in home for aged	0	+	-	0	0
Socioeconomic status					
Mean years of schooling	+	-	+	+	+
% w/1+ years of college	+	0	+	0	+
% in the labor force	-	+	-	0	0
% on welfare	-	+	-	0	0
Mean job income	0	-	0	0	0
Mean business income	0	-	0	0	0
Mean social security income	+	0	+	+	0
Mean welfare income	0	+	+	0	0
Mean total personal income	0	-	+	0	0
Mean total household income	+	+	+	0	+
% 200%+ poverty level	+	0	+	+	+
% below poverty level	-	0	-	-	-
Age of housing	-	-	-	-	-
Home ownership	0	-	0	0	-
Complete plumbing	+	0	+	+	+
Central air	+	+	+	+	+

Source: ref. 2

white component of the state's inmigrant flow did alter the racial composition of the elderly population. Also, the higher income levels increased the portion of the population in upper-income brackets and decreased the percent living below the poverty level. Most migrants lived in new homes with complete plumbing and central air conditioning.

Overall, North Carolina migrants represented the middle ranges for household income and independence levels. Where they did have an impact on the state's demographic profile, they served to raise the population's level of independence.

Texas

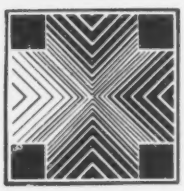
Migrants who moved to Texas ranked next to the lowest in independence levels (see Table 3, page 10). On many characteristics, Texas migrants were similar to California's newcomers although a greater percentage of Texas migrants were white. Further, among elderly migrants to Texas from abroad more came from Mexico (one-third) than any other country.

With the exception of California migrants, fewer Texas elderly migrants lived independently and more were needy. They represented the lowest percentage in the upper-income category, and next to the highest percentage of elderly living below the poverty line.

Texas' approximately 83,000 elderly migrants (including movers from abroad) were similar to the resident population in many ways; where they differed, they improved the independence level of the total elderly population (see Table 4, page 13). Migrants raised the average level of education and total household income. The percentage of Texas elderly in the upper-income category increased and the segment below the poverty line decreased. Migrants moved into new homes of better quality than the state's elderly residents. Most newcomers were renters, however, so they lowered the state's elderly home ownership rate.

The influx of migrants decreased the portion of the Texas residents who were black and increased the proportion who did not speak English well. The percentage of married elderly also decreased. Texas migrants also decreased the percentage of elderly living alone. On the other hand, they also decreased the percentage living in independent households and increased the percentage living with a child.

Only California's elderly migrants were more dependent than those moving to Texas. Nevertheless, these newcomers contributed to a decrease in dependency in both income and household arrangements.



The Consequences of a Graying Sunbelt

Each decade finds more citizens in their retirement years moving to the Sunbelt. This flow of migrants has every indication of continuing, if not increasing in number, during the late 1980s and early 1990s. Most migrants are in their early retirement years, are well-educated, financially secure, and accompanied by their spouse to establish independent households. At the same time, the Sunbelt is losing its older, more dependent elderly to the non-Sunbelt states.

But, when we look at migration from all other states and abroad, the kinds of elderly persons moving to the five major Sunbelt destinations varies widely. Arizona and Florida drew the youngest and most independent elderly migrants. These newcomers lowered the age and raised the independence levels of the states' resident elderly populations.

The "graying" of Florida and Arizona, then, means increased demand for retail goods, recreational, health and protective services, and for new housing suitable for retired couples. Because of the new migrants' affluence, few will seek jobs or welfare.

On the other hand, California and Texas attracted the older, more dependent elderly. The large segment of elderly migrants moving into homes of relatives or institutions will place little demand on the housing markets in these states. The demand for retail, health and protective services, however, will increase somewhat in both states.

In California, the large number of migrants receiving welfare will place additional pressure on local and state social services and agencies for the aged.

A similar burden will be shouldered by non-Sunbelt states losing their younger, more independent elderly to the Sunbelt and receiving older, more dependent elderly in return. The loss of upper-class elderly means less demand for retail services and a shrinking tax base to finance programs needed by dependent elderly returning "home."

Despite the different age or independence levels of their groups of elderly migrants, all Sunbelt states must prepare to cope with the increased numbers of older citizens. Local communities will find older people pressing supermarket, drug store, variety and department store lines awaiting service and demanding their "Golden Age" discounts.

Physicians, particularly those who specialize in geriatrics, heart disease and chronic diseases such as arthritis, will be challenged by increased patient loads for both short-term and long-term care. Increased demand on housing will press the capacity of local water and sewer systems along with other utilities. The elderly's vulnerability to crime will bring added demand for protection by local police and fire departments.

The new elderly inmigrants bring the more fiscally conservative orientation typical of their generation. The degree of their impact on local and state politics is yet to be discerned. Recent support for a proposition to cut the Florida budget by nearly one-fourth suggests a conservative swing in that state. If Florida is representative of political change in the Sunbelt, fiscal conservatism can be expected to increase in many areas.

Further, the types of public projects receiving voter support are likely to change. Priority may shift from preschool classroom enrichment and hot-lunch programs in the public schools to services provided by local aging agencies. Bond issues for school construction may find less support than those for adult recreation facilities and increased fire and police department protection.

To all the Sunbelt states, the "graying" process brings a larger elderly population. These states will be challenged to make changes in both the private and public sectors rapidly enough to meet both the demands of their elderly newcomers who move to the "fun and sun" states to enjoy their retirement, and the needs of their older, more dependent elderly.

Federal Policy Implications

The "graying" of the Sunbelt brings prosperity to Arizona and Florida, increased public welfare demand to California, and a reduced tax base *and* increased public welfare demand to many states outside the Sunbelt.

Yet, federal funds for state-run programs under the Older Americans Act are allocated based on the size of the state's population age 60 and over. Arizona and Florida whose elderly are clearly from upper-income levels receive as much support per older person as California and Michigan.

The Older American's Act, which included about $640 million for senior centers and meal programs in fiscal 1983, was intended to benefit all senior citizens not just the poorest individuals. In 1978, Congress reaffirmed this position, but asked that special consideration be given to the needs of low-income elderly.

As the richest elderly move to a few states leaving the poorer elderly behind, "special consideration for low-income elderly" may mean a new formula for determining each state's share of Older Americans Act funds. If the disability rates, income levels and household arrangements of a state's elderly population are considered, states could share more equitably in the Act's funds.

Before 1981, the other major source of federal funds for state-run programs benefiting senior citizens came under Title XX of the Social Security Act. A variety of child day care, family planning, emergency services, and transportation and home-based services for the elderly and disabled were financed in this manner. During 1981, all these services were consolidated into Social Services Block Grants and the funds cut back. Now, the states themselves decide who is eligible and which services receive priority. States also decide how much local funds will be used to supplement the federal money received.

According to an August 1984 report by the U.S. General Accounting Office, 11 out of 13 states surveyed have used state and local funds to increase this type of social services spending since the federal funding cutbacks took place.[4] Despite increased state spending, total program budgets have not kept pace with inflation, according to the report.

The $2.7 billion in funds states receive under the Social Service Block Grants are allocated according to the size of the state's population of all ages. Numbers of disabled or dependent elderly, for example, are not taken into account. This sort of formula is short-changing states such as Illinois, New York, Michigan and Pennsylvania that are losing their wealthy elderly to the Sunbelt and receiving older and lower-income elderly in return. California, which is gaining large numbers of low-income elderly residents, may be similarly slighted. Raising state and local funds to serve these larger-than-average poor elderly populations becomes more challenging in these states.

Only a radical change in federal allocation formulas will compensate for the inequities. The age, household and economic dependence levels in each state's elderly population must be considered along with total numbers when determining federal payments to the states. Only in this way will all state budgets be equally tapped to provide adequately for the needs of their elderly population.

Footnotes

1. An interstate migrant stream refers to a particular state-to-state migration pattern as determined by an analysis developed by Wiseman and Roseman, 1972. This technique isolates those state-to-state streams that are larger than would be expected from the proportional distribution of the nation's total elderly migration patterns.
2. Longino, Charles F., Jr., "Going Home: Aged Migration in the U.S., 1965-1970," *Journal of Gerontology*, 34:736-745, 1979.
3. *Ibid.*
4. U.S. General Accounting Office, "States Use Several Strategies to Cope with Funding Reductions Under Social Services Block Grants," *Report to the Congress*, HRD-84-68, August 9, 1984.

References

1. U.S. Bureau of the Census, 1980 Census of Population. *Residence in 1975 for States by Age, Sex, Race, and Spanish Origin*. Supplementary Report PC80-S1-16. Washington, D.C.: U.S. Government Printing Office, 1984.
2. Data tabulated from Bureau of Census printed documents for 1960, 1970 and 1980; the one-in-one hundred Public Use Sample (PUS) of Basic Records for 1960; the one-in-one hundred state 15 percent PUS for 1970; and the five-in-one hundred Sample A, Public Use Microdata Sample for 1980.
3. Data same as above. The figures in this table are significant at .05.

Bibliography

Biggar, Jeanne C., Cynthia B. Flynn, Charles F. Longino, Jr. and Robert F. Wiseman, *Elderly Migration Patterns, 1955-1960 and 1965-1970: 1955-1960 Patterns, Selectivity and Change, 1955-1960 to 1965-1970 Decade Trends*, Final Report to National Institute on Aging (December 1982).

Biggar, Jeanne C., "The Sunning of America: Migration to the Sunbelt," *Population Bulletin*, Vol. 34, No. 1 (March 1979).

Flynn, Cynthia B., Jeanne C. Biggar, Charles F. Longino, Jr. and Robert F. Wiseman, *Aged Migration in the United States, 1965-1970*, Final Report to the National Institute on Aging (February 1979).

Longino, Charles F., Jr., "Going Home: Aged Return Migration in the U.S. 1965-1970," *Journal of Gerontology*, 34:736-745 (1979).

Wiseman, Robert F. and C.C. Roseman, "A Typology of Elderly Migration Based on Decision-Making Process," *Economic Geography* 55:324-337 (1979).

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